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COPEPODA, HARPACTICOIDA

BY

R. B. SEYMOUR SEWELL, C.I.E., Sc.D., F.R.S.
(Lieut.-Colonel, I.M.S. [ret.])

WITH EIGHTY-EIGHT TEXT-FIGURES AND ONE CHART

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INTRODUCTION.

A study of the Harpacticoida is rendered difficult by the fact that in very many, if not in most, instances very few examples of a species are obtained in any one particular collection, such as a weed-washing ; it is thus almost impossible to determine the limits within which any given species may vary in either size or structure, and in consequence one is much inclined to create " new species " on small differences of structure, especially when such differences are associated with a constant and not infrequently a marked difference in body size or a wide geographical separation. A number of Harpacticids are now known to have an almost world-wide distribution, and thus geographical separation has little or no value as evidence of specific distinction.

In the following paper I have included, in addition to the species taken in regions that were visited by the John Murray Expedition, a number of others that were obtained in previous years by the R.I.M.S. " Investigator ". The great majority of these collections were made by washing in a weak solution of formalin weed or branches of coral, especially of the " Stag-horn " kind of *Acropora*, the basal stems of which are frequently overgrown with algæ. The species thus obtained are as follows :

Genus *Longipedia* Claus.
    Longipedia coronata Claus.
    L. rosea Sars.
    L. scotti Sars.
    L. weberi A. Scott.

Genus *Canuella* T. and A. Scott.
  Subgenus *Canuella.*
    Canuella (*Canuella*) *furcigera* Sars.
    C. (*C.*) *scotti* nom. nov. (for *C. curticauda* A. Scott, *non* Thompson and A. Scott).
  Subgenus *Ellucana* nov.
    Canuella (*Ellucana*) *longicauda* sp. nov.
Genus *Ectinosoma* Boeck.
    Ectinosoma melaniceps Boeck.
Genus *Pseudobradya* Sars.
    Pseudobradya similis (T. and A. Scott).
Genus *Microsetella* Brady and Robertson.
    Microstella norvegica (Boeck).
Genus *Euterpina* Norman.
    Euterpina acutifrons (Dana).
Genus *Macrosetella* A. Scott.
    Macrosetella gracilis (Dana).
Genus *Miracia* Dana.
    Miracia efferata Dana.
Genus *Ægisthus* Giesbrecht.
    Ægisthus aculeatus Giesbrecht.
    Æ. mucronatus Giesbrecht.
Genus *Clytemnestra* Dana.
    Clytemnestra scutellata Dana.
Genus *Peltidium* Philippi.
    Peltidium exiguum A. Scott.
    P. intermedium A. Scott.
    P. maldivianum sp. nov.
    P. minutum A. Scott.
    P. ovale Thompson and A. Scott.
Genus *Tegastes* Norman.
    Tegastes minutus sp. nov.
Genus *Syngastes* Monard.
    Syngastes imthurni (Thompson and A. Scott).
    S. indicus sp. nov.
Genus *Porcellidium* Claus.
    Porcellidium acuticaudatum Thompson and A. Scott.
    P. fimbriatum Claus.
    P. tuberculatum Wolfenden.
Genus *Harpacticus* M. Edwards.
    Harpacticus clausi A. Scott.
    H. fucicolus T. Scott.
    H. gracilis Claus.
      ,, var. *orientalis* Sewell.
    H. littoralis Sars.

Genus *Tisbe* Lilljeborg.
  Tisbe ensifera (Sars), var. *indica* (Sewell).
  T. furcata (Baird).
  T. gracilis (T. Scott).
  ? *T. longisetosa* Gurney.
  T. tenera (Sars).
Genus *Tisbintra* nov.
  Tisbintra nicobarica sp. nov.
Genus *Paraidya* nov.
  Paraidya major sp. nov.
  P. minor sp. nov.
Genus *Scutellidium* Claus.
  Scutellidium longicaudum (Philippi).
  S. machairopoides (Monard).
  S. plumosum Brady.
Genus *Phyllothalestris* Sars.
  Phyllothalestris mysis (Claus).
  P. orientalis sp. nov.
  P. sarsi sp. nov.
Genus *Rhynchothalestris* Sars.
  Rhynchothalestris rufocincta (Norman).
  R. similis A. Scott.
Genus *Parastenhelia* Thompson and A. Scott.
  Parastenhelia littoralis (Sars).
  P. littoralis, f. *pennicillata* Willey.
  ,, f. *scotti* nom. nov.
Genus *Xouthous* Thomson.
  Xouthous laticaudata (Thompson and A. Scott).
  X. maldiviæ sp. nov.
  X. purpurocinctum (Norman and T. Scott).
Genus *Eudactylopus* A. Scott.
  Eudactylopus fasciatus sp. nov.
  E. latipes T. Scott, f. *andrewi* nom. nov.
  E. opima (Brian), f. *major*.
  ,, ,, *minor*.
  E. striatus sp. nov.
Genus *Dactylopusia* Norman.
  Dactylopusia brevicornis (Claus).
  D. falcifera Willey, f. *pallida*.
  ,, ,, f. *violacea*.
  D. thisboides (Claus).
  D. tropica sp. nov.
Genus *Jalysus* Brian.
  Jalysus investigatoris sp. nov.
  J. proximus sp. nov.

Genus *Parawestwoodia* Sharpe.
- *Parawestwoodia nobilis* (Baird).

Genus *Pseudothalestris* Brady.
- *Pseudothalestris imbricata* Brady.
- *P. minuta* (Claus).
- *P. nana* T. Scott.

Genus *Diosaccus* Boeck.
- *Diosaccus hamiltoni* (Thompson and A. Scott).
- *D. monardi* sp. nov.
- *D. truncatus* Gurney.

Genus *Amphiascus* Sars.
- *Amphiascus ægyptius* Gurney.
- *A. calcarifer* sp. nov., f. *major*.
- ,, ,, f. *minor*.
- *A. cinctus* (Claus).
- *A. coralicola* sp. nov.
- *A. ctenophorus* Monard.
- *A. dentatus* (Thompson and A. Scott).
- *A. havelocki* (Thompson and A. Scott).
- *A. hirsutus* (Thompson and A. Scott).
- *A. inermis* sp. nov.
- *A. nicobaricus* sp. nov.
- *A. rebus* sp. nov.
- *A. robinsoni* (A. Scott).
- *A. similis* (Claus).
- *A. typhlops* Sars.
- *Amphiascus* sp.

Genus *Teissierella* Monard.
- *Teissierella adduensis* sp. nov.
- *T. knoxi* (Thompson and A. Scott).
- *T. proxima* (T. Scott).

Genus *Stenhelia* Boeck.
- Subgenus *Delavalia* Brady.
  - *Stenhelia* (*Delavalia*) *latisetosa* sp. nov.
  - *S.* (*D.*) *polluta* Monard.
  - *S.* (*D.*) *truncatipes* sp. nov.

Genus *Ameira* Boeck.
- *Ameira parvula* (Claus).

Genus *Nitocra* Boeck.
- *Nitocra spinipes* Boeck, var. *orientalis* Sewell.

Genus *Leptomesochra* Sars.
- *Leptomesochra nasuta* sp. nov.

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Genus *Phyllopodopsyllus* T. Scott.
    Phyllopodopsyllus furcifer Sars.

Genus *Laophonte* Philippi.
    Laophonte adduensis sp. nov.
    L. brevirostris (Claus).
    L. bulbifera Norman.
    L. cornuta Philippi.
    L. gurneyi Lang.
    L. macani sp. nov.
    L. meinerti Brady.
    L. strömi (Baird).
    L. trispinosa sp. nov.

Genus *Ceyloniella* Wilson.
    Ceyloniella armata (Claus), f. *major*.
    ,,   ,,   f. *minor*.
    C. nicobarica sp. nov.

Genus *Laophontella* Thompson and A. Scott.
    Laophontella armata (Willey), var. *indica* nov.

Genus *Orthopsyllus* Brady.
    Orthopsyllus sp.
    O. linearis (Claus).

Genus *Enhydrosoma* Boeck.
    Enhydrosoma nicobarica sp. nov.

Genus *Metis* Philippi.
    Metis jusseaumei (Richard), f. *major*.
    ,,   ,,   f. *minor*.

THE OCCURRENCE OF DIMORPHISM.

It is now well recognized that within the limits of any given species of Copepod, especially in the Calanoida, we may have races of different size that occupy areas in which the local conditions are different, either as regards salinity or temperature, or both ; but this difference is not the same as that which I am here considering, for in these dimorphic forms individuals of the two sizes are in the great majority of instances found to be living together, inhabiting the same, often quite small, habitat, and are thus living under identical conditions.

In previous papers (*vide* Sewell, 1912 and 1929) I have directed attention to the occurrence of what appears to be sexual dimorphism in certain marine and brackish-water species of Calanoida, and Farran (1926, 1929 and 1936) has noted the occurrence of dimorphic forms in yet other species, namely :

		Large form. (mm.)	Small form. (mm.)
Clausocalanus arcuicornis (Dana)	♀	1·17	0·94
(*vide* Farran, 1926, p. 238	♀	1·4–1·6	1·2–1·4
1929, p. 223			
1936, p. 82			
Sewell, 1929, p. 91)			
Nannocalanus minor (Claus)	♀	1·55–1·64	1·32–1·49
(*vide* Sewell, 1929, p. 21)			
Paracalanus aculeatus Giesbrecht	♀	0·89–0·99	0·69
(*vide* Sewell, 1912, p. 326	♂	1·238	0·996
1929, p. 62)			
Undinula vulgaris (Dana)	♀	2·208–2·623	1·868–2·189
(*vide* Sewell, 1929, p. 37)			
Lophothrix frontalis Giesbrecht	♀	5·812–6·125	4·875–5·375
(*vide* Sewell, 1929, p. 193)			
Lucicutia flavicornis (Claus)	♀	1·63–1·80	1·3–1·4
(*vide* Farran, 1936, p. 111)			
Pleuromamma abdominalis (Lubb.)	♀	2·95–3·06	2·52–2·76
(*vide* Farran, 1936, p. 110)	♂	2·76–3·21	2·40–2·68

In 1905 T. Scott (1905*a*, p. 49), in an account of the Entomostraca of the Gulf of St. Lawrence, reported that he had found two forms of *Eurytemora herdmani* Thompson and A. Scott occurring together ; he gives the sizes of these two forms in each sex as follows :

Large form, ♂, 1·61 mm. ; ♀, 1·52 mm.
Small form, ♂, 1·14 ,, ♀, 1·12 ,,

" The smaller differed from the larger and typical form by possessing slightly fewer spinules on the spines of the 5th foot of the female " (Scott). Gurney (1931) has recorded the occurrence of large and small sexually-mature forms, occurring in the same locality, in two species of *Diaptomus*, namely in *D. laticeps* Sars, in which species both sexes were affected, and in *D. wierzejskii* Richard in two localities, in one of which both sexes were affected, and in a second in which only the females exhibited this dimorphism. In the case of *D. laticeps* Gurney remarks, "The range of size in Loch Hundland (Orkneys) is so great (♂, 1·05–1·4 ; ♀, 1·12–1·60 mm.) that it seems necessary to suppose that in some cases there is a moult in the adult to a 'high form' or Stage VII, which is not distinguished by structural change" (Gurney, 1931, p. 170). In the case of *D. wierzejskii* from Tunisia the high and low forms of the males and females had the following length measurements :

Small form ♂, 1·338 mm. ; ♀, 1·590 mm.
Large form, ♂, 1·635 ,, ; ♀, 2·150 ,,

and examples of this species taken in the Shetlands showed a similar variation in size in the females, a small form measuring 1·50 mm., and a large one 1·73 mm.

The occasional presence of two sexually-mature forms, differing primarily in size, is, however, by no means limited to the Calanoida, but is also present, and perhaps more frequently than is as yet recognized, in certain species of both Cyclopoida and Harpacticoida. In the Cyclopoida T. Scott (1905*b*, p. 143) has recorded the presence in the same locality, namely, South Bay, Firth of Forth, of two forms of the species *Euryte longicauda* Philippi; he gives the sizes of these two forms as (i) larger, 1·22 mm. in length, and (ii) smaller, 0·8 mm.; he does not state whether he obtained these two forms in both sexes, and as he mentions the females only, it must be presumed that only this sex exhibited dimorphism. In the two forms he noticed slight differences in the structure of the 5th feet, affecting both shape and armature. Sars (1913, p. 26) has recorded finding two similar size-groups in this species in the inner part of the Christiania Fjord; both groups were sexually mature, and he was unable to detect any difference, apart from size, between the individuals of the two groups. Farran, in the same year (1913, p. 182), recorded the presence in the sea round Christmas Island, Indian Ocean, of two forms of *Oithona setigera* Dana, the smaller form measuring 1·20–1·26 mm. and the larger 1·6–1·9 mm.; "there did not appear to be any specimens of intermediate size connecting the larger and smaller forms" (Farran). I have myself observed a similar difference in size between specimens of *Oithona plumifera* Baird that were taken in the neighbourhood of the Nicobar Islands, the small form measuring 1·2–1·37 mm., and the large form 1·67 mm., the latter agreeing with the form that was described by Brady under the name *Oithona challengeri*.

Among the Harpacticoida I recorded (Sewell, 1924, pp. 821 *et seq.*) dimorphism in both sexes of *Teissierella propinqua* (T. Scott) (= *Amphiascus scotti* mihi) from the Chilka Lake, and Gurney (1927*c*, p. 532) later described the same type of dimorphism in the closely allied species *Teissierella knoxi* (Thompson and A. Scott) (= *Robertsonia knoxi*), taken in the Suez Canal area. Monard (1928*a*) has also recorded this form of dimorphism in several species of the Harpacticoida. In *Harpacticus littoralis* Sars he had under observation two forms of the female, measuring respectively 0·4–0·5 mm. and 0·6–0·7 mm., both taken apparently in the same area. In the species *Porcellidium fimbriatum* Claus he has described a typical form and a variety; the typical form measured 0·7 mm. in length, and the variety, *macrurus*, was only 0·53 mm.; both forms were ovigerous, and there were slight anatomical differences between them in the length of the furca and the shape of the genital segment, which was quadrangular in the typical form and rounded in the variety. Again, in the species *Amphiascus debilis* Giesbrecht Monard (*loc. cit.*, p. 391) describes two forms, measuring respectively 0·45 mm. and 0·54 mm. in length; here again the difference in size was accompanied by slight differences in structure; these two forms were taken in the same locality, namely "boue du vivier, baie derrière de laboratoire", and the structural differences were as follows: "la première plus grande, a le distal de P_v tres allongé, 2 1. La deuxième plus petite, possède un distal court: 1½ 1" (Monard).

In the present collections dimorphism of this type has been found to be present in the following species:

		Male. (mm.)	Female. (mm.)
Eudactylopus opima (Brian)	f. *major*	1·162	1·65–1·76
	f. *minor*	0·866	0·899
Amphiascus calcarifer sp. nov.	f. *major*	..	1·05–1·13
	f. *minor*	0·65	0·79
Ceyloniella armata (Claus)	f. *major*	..	0·904–1·013
	f. *minor*	..	0·691
Metis jusseaumei Richard	f. *major*	0·68	0·82
	f. *minor*	..	0·45

In addition to these cases of dimorphism, one must not overlook the possibility that certain forms, now considered to be distinct species, may in reality be dimorphic forms of the same species; thus Monard (1928, p. 390) has suggested that *Amphiascus propinquus* Sars is only a small variety of *Amphiascus imus* Brady. The respective length measurements of the two forms are:

Amphiascus imus Brady . .	0·85 mm.
A. propinquus Sars . . .	0·57 ,,

In certain instances I have been unable to decide whether two closely related forms should be regarded as merely dimorphic forms of a single species or whether they are actually two distinct species; in two such instances, at the risk of being accused of inconsistency, I have given each form a specific name; such instances are:

	Length.	
	Female.	Male.
Paraidya major sp. nov. . . .	1·07 mm.	..
P. minor sp. nov.	0·70 ,,	..
Jalysus investigatoris sp. nov. . .	0·89 ,,	0·81 mm.
J. proximus sp. nov.	..	0·51 ,,

If now we take the length of the smaller form to be equal to 1, then the larger form in these species would have the following proportional length:

	Female.	Male.
Harpacticus littoralis . . .	1·444	
Porcellidium fimbriatum . . .	1·321	
Eudactylopus opima . . .	1·896	1·342
Amphiascus debilis . . .	1·200	
A. calçarifer	1·386	
Teissierella propinqua . . .	1·317	
T. knoxi	1·968	
Ceyloniella armata . . .	1·386	
Metis jusseaumei	1·822	
Paraidya major and *minor* . .	1·529	
Amphiascus propinquus and *imus* .	1·491	
Jalysus investigatoris and *proximus* .	..	1·588

The difference in size of the females of the dimorphic forms clearly falls into two groups, the first ranging from 1·200 to 1·444, and the second from 1·822 to 1·968. The average difference in the first group is 1·342, and in the second 1·895. In my previous papers I have given the growth-factors in eighteen species of Calanoid Copepoda and the average of all these is 1·302. If the two forms *major* and *minor* represent successive stages in the life-history of a species, the proportional difference between them should clearly be equal to the growth-factor, and the close approximation of the average observed difference, as given above, namely 1·342, to the average growth-factor, 1·302, supports the view that this is the explanation of the occurrence of the two forms. In the second group, however, in which the average observed difference between the two forms *major* and *minor* is 1·895, and hence is far larger than any growth-factor, this large difference would at first sight appear to contra-indicate such an explanation; it is, however, interesting to note that this difference, 1·895, is the square of 1·376, a figure that falls well within the limits of range of difference in the first group; I have in previous papers (1929, p. 73, fig. 28; 1932, p. 393, fig. 130) shown that in certain circumstances certain species, namely *Paracalanus crassirostris* Dahl and *Acartia* (*Euacartia*) *southwelli* Sewell, may become sexually mature at the 5th stage; the f. *minor* may possibly thus arise as a result of the early attainment of sexual maturity in Stage V, and the f. *major* in consequence of sexual maturity being delayed to Stage VII, the difference in size between the two stages then being the square of the normal growth-factor for that species.

In several instances the occurrence of these dimorphic forms is associated with abnormal conditions of habitat; the two forms of *Amphiascus calcarifer* were taken together in a small, shallow, isolated pool on the reef of Addu Atoll, in the Maldive Archipelago, in which the temperature of the water and its salinity were both high, owing to evaporation; the two forms of *Ceyloniella armata* (Claus) were also taken together in washings from weed that was growing in shallow water on the lagoon reef of the same atoll, where, as I have previously shown (Sewell, 1936, p. 124), the temperature of the water may rise to over 36° C. The two forms of *Teissierella propinqua* T. Scott (= *Amphiascus scotti* mihi) were taken in the Chilka Lake (*vide* Sewell, 1924), in which the salinity and temperature of the water is subject to great seasonal changes; similarly in the case of *Teissierella knoxi* (Thompson and A. Scott) the small form was obtained from the Suez Canal or at its two extremities, which are in open communication with the sea, whereas the large form was obtained from saline pools or from a small pool on an island in Lake Timsa, in which the water had a high salinity. The two forms of *Eudactylopus opima* (Brian) were taken in weed that was growing on the reefs of Nankauri Harbour or of Addu Atoll, where temperatures may be abnormally high, and the same was the case with the two forms of *Metis jusseaumei* (Richard). Of the earlier records the two forms of *Euryte longicauda* Philippi were taken in enclosed waters in the Gulf of St. Lawrence and in the inner part of the Christiania Fjord, in both of which localities considerable changes in the character of the water are to be expected. It thus seems reasonable to assume that in some way the variability in the physical characters of the habitat may react on the developing animal, and may either induce an additional moult, thus causing the appearance of a "high" dimorph, or may induce a precocious onset of maturity, thus causing the appearance of a "low" dimorph, and that such forms may make their appearance in any group of the Copepoda.

MODIFICATION IN THE CHARACTER OF THE FURCAL SETÆ.

In a number of species of Harpacticoida it has been noticed that one or more of the furcal setæ may, either normally or as a variation, exhibit a modification in which the base, or in a few instances the greater part of the length is swollen and expanded, thus forming a marked contrast to the more usual slender tapering form. Brady (1880) called attention to the swollen condition of the two inner furcal setæ in *Amphiascus imus* (Brady) (= *Stenhelia ima* Brady), but from his account it is not clear whether this condition occurs in both sexes; he also recorded a similar condition in the male of *Idomene forficata* Philippi (=*Dactylopus flavus* Brady), and in one or both sexes—from his account it is not clear which—in *Metis ignœa* Philippi (=*Ilyopsyllus coriaceus* Brady and Robertson). Scourfield (1912, p. 14, pl. i, fig. 10) recorded a similar modification of the main furcal seta in a single immature specimen of *Canthocamptus* (*Mesochra*) *hirticornis* Scott, taken with other normal examples in Clare Island, and he points out that though this modification may be an example of malformation, it more probably represents a distinct mutation. Willey (1935, p. 58) has called attention to a variation of this type that he found in the middle caudal seta of a subspecies of *Amphiascus minutus* (Claus), which he named *calcaratus*; in this subspecies he obtained two distinct forms, *crassipes* and *tenuipes*; in the former in an ovigerous female the middle caudal seta was swollen at the base, but no such modification was found in ovigerous specimens of *tenuipes*. It would thus appear that this swollen character of one or more of the furcal setæ may be present normally in a species, or may occur as an abnormality or variation.

A perusal of the literature shows that this swollen or thickened character of one or more of the furcal setæ occurs in a number of species and may be divided into several different types:

I. The swelling affects only the extreme basal part of the seta and is usually symmetrical, so that the swelling is pyriform, but occasionally is more or less asymmetrical, occurring on one side of the seta only. This type of modification has been recorded in the following species:

(A) Furcal seta 1, swollen and modified to form a spine:
    Idomene forficata Philippi (= *Dactylopus flavus*, Brady) ♂ only.
(B) (i) Furcal seta II, thickened or slightly swollen:
        Amphiascus abyssi (Boeck), ♀.
        A. affinis Sars, ♀, ♂ unknown.
        A. debilis (Giesbrecht), ♀.
        A. intermedius (Scott), ♀.
        A. minutus (Claus), ♀.
        A. nanus Sars, ♀, ♂ unknown.
        A. pallidus Sars, ♀.
        A. parvus Sars, ♀, ♂ unknown.
        A. propinquus Sars, ♀.
        A. sinuatus Sars, ♀.
        A. tenuiremis (Brady), ♀.
        A. thalestroides Sars, ♀.
        A. typhlops Sars, ♀.
        Metis jusseaumei (Richard), var., ♀.
    (ii) Furcal seta II moderately swollen:
        Amphiascus calcarifer sp. nov., ♀ only.
        A. hirsutus (Thompson and A. Scott), ♂, ♀.
        A. latifolius Sars, ♀, ♂ unknown.
        A. longirostris (Claus), ♀.
        A. minutus calcaratus Willey, f. *crassipes*, ♀.
        A. nanoides Sars, ♀, ♂ unknown.

A. nicobaricus sp. nov., ♀ only.
Dactylopusia latipes Boeck, ♀.
D. spinipes Brady, ♀.
D. thisboides Claus, var. ♀.
Diosaccus monardi sp. nov., ♀, ♂ unknown.
Laophonte trispinosa sp. nov., ♀, ♂ unknown.
Marænobiotus vejdovskyi Mrazek.
Parastenhelia littoralis (Sars), f. *scotti*, ♀.
P. littoralis (Sars), f. *littoralis*, ♀.
Phyllopodopsyllus bradyi Scott, ♀ only.
P. furcifer Sars, ♀, ♂ unknown.
Pseudothalestris imbricata Brady, ♀ only.
Teissierella adduensis sp. nov., ♀, ♂ unknown.

(iii) Furcal seta II markedly swollen :
Amphiascus dictyophorus Monard, ♀, ♂ unknown (seta short and bulbous).
A. giesbrechti Sars, ♀.
A. typhloides Sars, ♀, ♂ unknown.
Mesochra rapiens (Schmeil), var. Immature.
Parastenhelia forficula (Claus), ♀.

(c) Furcal setæ II and III swollen :
Amphiascus attenuatus Sars, ♀, ♂ unknown.
A. imus (Brady), ? ♀, ♂.
Dactylopusia euryhyalina Monard.
D. mediterranea Lang.
Parastenhelia littoralis Sars, f. *penicillata* Willey, ♀.
Tisbe tenella (Sars), ♀, ♂ unknown.
Stenhelia (*Delavalia*) *latisetosa* sp. nov., ♀, ♂ unknown.

(d) Furcal seta III swollen :
Amphiascus bulbifer Sars, ♀.
A. hispidus (Norman), ♀.
Stenhelia giesbrechti (Scott), ♀, ♂ unknown.

(e) Furcal seta IV swollen and very short :
Paramesochra holsatica Klie.

II. The swelling affects a considerable length of the basal part of seta II and there is an abrupt termination of the swelling distally, so that the swollen part is cylindrical :

Amphiascus coralicola sp. nov., ♀, ♂.
A. havelocki (Thompson and A. Scott), ♀, ♂ unknown.
A. littoralis T. Scott.
Ceyloniella armata (Claus), var., ♀.
Cyllindropsyllus lævis Brady, ♀.
Dactylopusia falcifera Willey, f. *violacea*, ♀.
Mesochra armoricana Monard, ♀.
Metis natans (Williams).
Teissierella adduensis sp. nov., ♀, ♂ unknown.

III. (i) The swelling affects the greater part of the length of seta II, so that the seta is " spathulate " or " lancet-shaped " :

Amphiascus brucei T. and A. Scott, ♀, ♂ unknown.
Ceyloniella nicobarica sp. nov., ♀ only.
Metis ignœa Philippi, var., ? ♀, ♂.
Stenocaris minor (T. Scott).

(ii) Seta II " spathulate " and seta IV swollen and pyriform :
Phyllognathus vigueri (Maupas).

From the above list it seems clear that this modification occurs most frequently in the 2nd or main furcal seta, much less frequently in the 3rd, and very rarely in the 1st or 4th. It is also clear that it is much more common in the female than in the male.

A structural modification of the setæ of the furcal rami, and in a few instances of the setæ of one of the appendages, has been recorded in several species of the Calanoida ; in this group the modification takes the form of a dichotomous branching of the seta, and the term " var. *plumulosus* " has been given to individuals exhibiting it. In a previous paper (Sewell, 1914) I have given an analysis of the occurrence of this modification in two species, *Canthocalanus pauper* (Giesbrecht) and *Undinula vulgaris* (Dana), and I pointed out that the modification is more common in females than in males, and that on the whole the number of setæ thus affected is greater in females. Here the setæ most frequently affected are those that possess the greatest length, namely, the 2nd, 3rd and 4th ; the number of observed instances in the different setæ are given below :

Seta.	Number of instances of modification.
1	41
2	68
3	54
4	35
5	5

There is thus some degree of resemblance between the occurrence of the two forms of modification ; but there is one great difference, namely, that in the Calanoida there is little or no evidence of symmetry in the occurrence, for out of a total of 52 observed instances, the modification was symmetrical in only 6 specimens, whereas in the Harpacticoida the modification is invariably symmetrical.

I put forward the suggestion that in the Calanoida this modification of the setæ might be the result of injury followed by regeneration, and that this injury might be inflicted during amplexus. Among the Harpacticoida Giesbrecht has described and figured a pair of *Mesochra lilljeborgi* in amplexus and the male was grasping the female in its prehensile antennules by the caudal setæ, but in the great majority of observed instances the male grasps the female by the body, and it thus seems difficult to suppose that the furcal setæ are in any special danger of being damaged.

It thus seems to be more probable that Scourfield is correct in his suggestion that this modification of the setæ in the Harpacticoida is a mutation. If this be so, then this mutation has arisen quite independently in several different families, and with much greater frequency in certain families and genera than in others. In the following list I have given the families affected, with the genera and the number of species in each, in which this mutation has been noticed :

Family.	Genera affected.	Approximate number of species in the genus.	Number of species affected.
Phyllognathopodidæ	*Phyllognathopus*	3	1 (33%)
Idyæidæ	*Tisbe*	16	1 (6%)
Metidæ	*Metis*	4	3 (75%)
Ceyloniellidæ	*Ceyloniella*	2	2 (100%)
Laophontidæ	*Laophonte*	95	1 (1%)
Cyllindropsyllidæ	*Cyllindropsyllus*	1	1 (100%)
Canthocamptidæ	*Paramesochra*	2	1 (50%)
	Mesochra	14	2 (14%)
	Marænobiotus	10	1 (10%)
Thalestridæ	*Dactylopusia*	27	6 (23%)
	Parastenhelia	9	2 (11%)
	Pseudothalestris	11	1 (9%)
Diosaccidæ	*Stenhelia (Delavalia)*	29	1 (3%)
	Amphiascus	85	31 (36%)
	Diosaccus	3	1 (33%)
	Teissierella	5	1 (20%)

The mutation is, however, by no means constant in occurrence in any given species. In the species *Parastenhelia littoralis* several forms have been described in which this character varies : in the Norwegian form described by Sars the furcal setæ are normal, but in the form recorded by Lang from Campbell Island, in the S.W. Pacific Ocean, the inner seta is thickened, and in some examples appears to be abruptly bent, thus corresponding to the condition described by Sars in *P. forficula* ; Willey (1935, p. 82, fig. 124), in his account of *P. littoralis*, f. *penicillata* from Bermuda figures both the 2nd and 3rd setæ as being swollen at the base, and the same condition occurs in examples from Addu Atoll, Maldive Archipelago ; in another form, f. *scotti*, the 2nd seta is expanded in a pyriform swelling in examples from both the Gulf of Guinea and Addu Atoll. Again, according to Gurney (1932, p. 8), in *Phyllognathopus viguieri* (Maupas) the 2nd furcal seta may present no less than three different conditions—" with basal part dilated and tapering to a slender hair, the whole about 1½ times as long as the ramus. The terminal part may be very much longer, or the whole seta may take the form of a flattened structure 2 to 3 times as long as the ramus, and with a dorsal ridge near its base ". These different forms appear to have a geographical distribution, for the first form (Gurney, 1932, fig. 347) occurs in specimens from Oxford, the second (Gurney, *loc. cit.*, fig. 346) in examples from Oxford and Kew, and the third (Gurney, *loc. cit.*, fig. 349) from specimens from Harpenden.

In the species *Metis ignæa* Philippi (=*Ilyopsyllus coriaceus* Brady and Robertson), Brady's examples, in which the 2nd seta was " spathulate ", were obtained in Roundstone Bay on the exposed west coast of Ireland, whereas specimens from the Suffolk estuaries taken by Gurney and those obtained by Sars on the Norwegian coast in moderate depths and on a muddy bottom, presumably therefore in a sheltered area, possessed setæ that were normal. In the closely related species, *Metis jusseaumei* (Richard) (=*Ilyopsyllis affinis* T. Scott), specimens from the Gulf of Guinea, in a shore lagoon, possessed a 2nd seta that was " slightly spathulate at the base ", but in examples from the Suez Canal, the Massachusetts coast of North America and the Mediterranean Sea this seta was normal; in the present collection, however, specimens from Nankauri Harbour, Nicobar Islands, possessed setæ that were long and slender, whereas those taken on the east side of Camorta Island, only a mile or so away, but outside the Harbour, exhibited a 2nd seta that was spathulate. Similarly in *Ceyloniella armata* (Claus), specimens of f. *major* taken inside Nankauri Harbour possessed normal setæ, whereas examples of f. *minor* from the west side of Nankauri Island, again only a mile or two away, but outside the sheltered waters of the harbour, were provided with a seta that was markedly thickened at its base. A similar but even more marked difference occurred in *Ceyloniella nicobarica* sp. nov., for in examples taken in the sheltered waters of Nankauri Harbour or of Addu Atoll the seta was slender and tapering, whereas in specimens from the more exposed coast of Nankauri Island outside the harbour the seta was markedly spathulate.

It thus seems probable, that the occurrence of this mutation may in some instances, at least, have a geographical significance and have given rise to local races; and the possession of normal setæ in a race or local group living in the sheltered waters of an almost landlocked region, such as Addu Atoll or Nankauri Harbour, and the presence of thickened or spathulate and therefore presumably stronger setæ in a race living in the rougher waters outside such a harbour suggests an adaptation to local conditions.

SYSTEMATIC ACCOUNT.

Family Longipediidæ.

Genus *Longipedia* Claus.

This genus is extremely well represented in the Indo-Pacific Region, no less than six species having been recorded. Thompson and A. Scott (1903, p. 257) recorded *Longipedia coronata* Claus and *L. minor* T. Scott from the Pearl Banks of Ceylon; A. Scott (1909, p. 195 *et seq.*) obtained *L. coronata* Claus, *L. scotti* Sars and *L. weberi* A. Scott in the " Siboga " collections from the Malay Archipelago; I have myself recorded the presence of *L. coronata* Claus in the Nicobar Islands, and of this species and *L. rosea* Sars in the Chilka Lake (Sewell, 1924), and further examples of this latter species have been taken in Nankauri Harbour, Nicobar Islands; and Gurney (1927*c*, p. 483 *et seq.*) obtained *L. coronata* Claus, *L. scotti* Sars, *L. minor* Scott and *L. brevispinosa* Gurney from the Suez Canal.

Longipedia coronata Claus.

Longipedia coronata, Sars, 1903–11, p. 10, pls. iv, v; Thompson and A. Scott, 1903, p. 257; A. Scott, 1909, p. 195, pl. lix, figs. 5–8; Sewell, 1924 (part), p. 804, pl. xlviii, fig. 1; Gurney, 1927*b*, p. 482, fig. 122; Wilson, 1932, p. 170, fig. 116.

Occurrence.—Addu Atoll, Maldive Archipelago, in weed-washings.

Descriptive Notes.—The total length of these specimens was only 0·66 mm.; they are thus much smaller than the examples that I have previously recorded (Sewell, 1924) from the Chilka Lake, which measured from 0·96–1·12 mm.

The proportions of the body are as follows :

Anterior region, 53 (cephalic segment 36).
Posterior region, 47.

Gurney (1927, p. 484) has called attention to the difficulty of distinguishing this species from *L. weberi* A. Scott, and is doubtful whether this latter can be maintained as a distinct species. I am inclined to think that he had before him examples of both species ; in my report on the Chilka Lake collection (Sewell, 1924, p. 805) I called attention to the apparent variability in the character of the 5th leg, and it now seems probable that I too failed to distinguish the present species from *L. weberi*.

In *L. coronata* the 3rd segment of the exopod of the 1st leg is devoid of any seta on its inner margin ; it thus bears only five setæ and spines, three external marginal spines, an end-spine and a single seta from the inner distal angle ; Monard (1928, p. 287) has called attention to this difference from *L. weberi*, in which an additional inner seta is present. As in the Chilka Lake specimens, the middle of the three spines arising from the distal end of the 3rd segment of the exopod of the 2nd leg has a bifid appearance, owing to the presence of a large subsidiary spinule that arises a little beyond the middle of its length ; there are a few smaller spinules on the proximal side of the larger one.

DISTRIBUTION.—This species has now been recorded from the Malay Archipelago (A. Scott) and the Pearl Banks of Ceylon (Thompson and A. Scott), between which localities I have obtained examples from Nankauri Harbour, Nicobar Islands and the Chilka Lake. It occurs in Addu Atoll in the Maldives, and throughout the Suez Canal (Thompson and A. Scott, Gurney), in the Mediterranean Sea (Claus, Thompson and A. Scott, Monard, Brian), and in the North Atlantic and its off-shoots, having been taken on the east coast of North America at Rhode Island and at Wood's Hole (Wilson), in the North Sea off Heligoland (Claus), in Kiel Bay (Kunz), and on the coast of Norway (Sars).

Thompson and A. Scott (1903) record it both in tow-nettings and in washings from marine invertebrates ; Sars found it in the surface muds of the fjords ; whereas I have only taken it in washings from weed.

Longipedia weberi A. Scott. (Text-fig. 1, A–F.)

Longipedia weberi, A. Scott, 1909, p. 196, pl. lix, figs. 9–12 ; Monard, 1928*a*, p. 287, figs. 1, 2.
Longipedia coronata, (part) Sewell, 1924, p. 804, pl. xlviii, fig. 1, ♀, p. 5 (*a*).

OCCURRENCE.—Addu Atoll, Maldive Archipelago, in weed-washings.

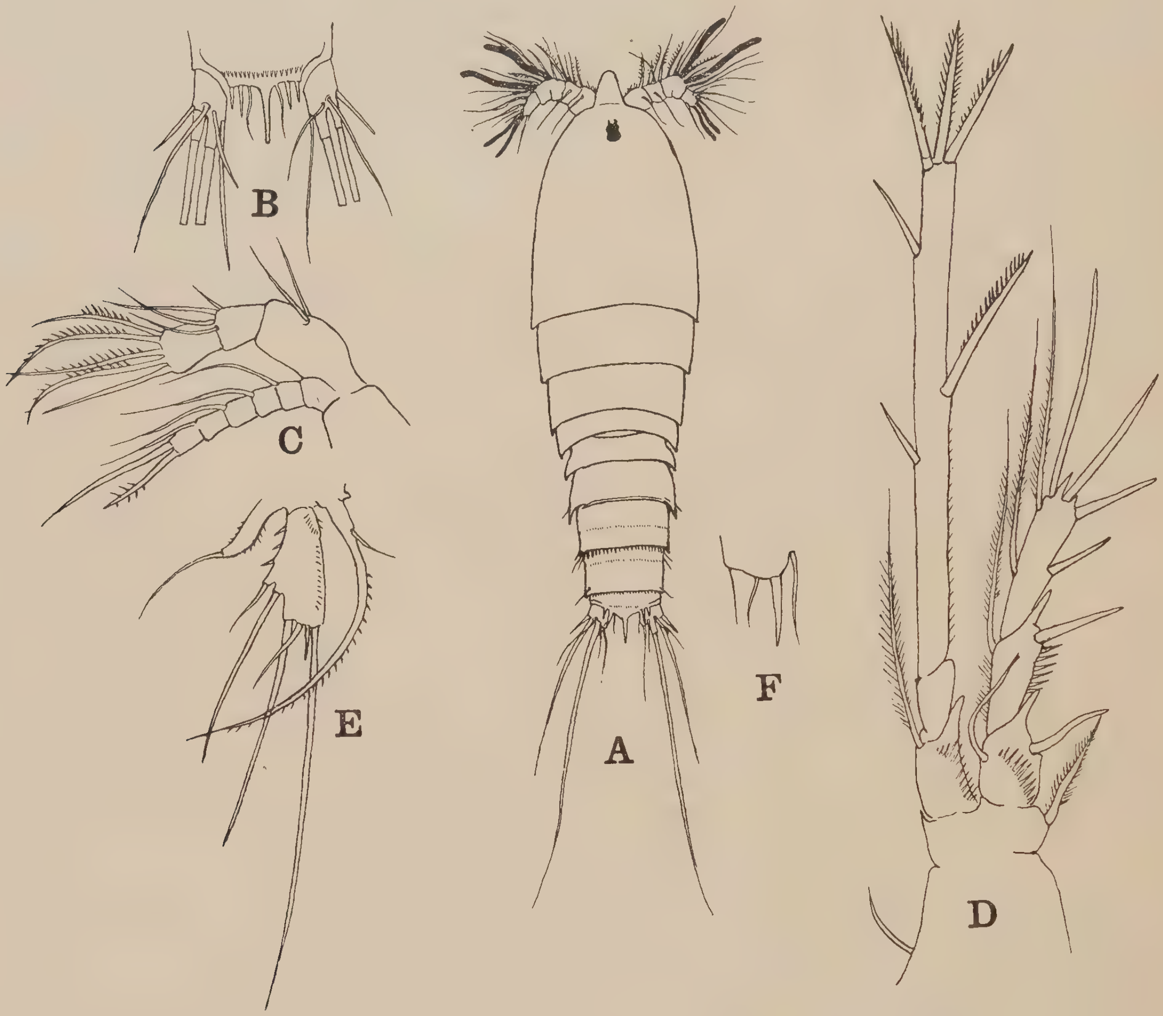
DESCRIPTIVE NOTES.—♀. The total length was 0·77 mm., and the proportional lengths of the two regions of the body were as follows :

Anterior region, 64 (rostrum 7).
Posterior region, 36.

These examples agree with the form that I described as Group A of *L. coronata* Claus in my account of the Copepoda of the Chilka Lake.

A comparison of this form (Text-fig. 1, A) with *L. coronata* reveals a number of minor differences. As already pointed out, the proportional lengths of the anterior and posterior regions of the body are different, the abdomen being relatively shorter in *L. weberi*, in spite of the fact that in preserved specimens of *L. coronata* the abdominal segments are as a rule more or less telescoped into each other, thus shortening the length of the abdomen as a whole. In *L. weberi* the cephalon is more rounded, and the widest part of the body lies at about the junction of the middle and posterior thirds of this segment, whereas in *L. coronata* the body is widest at the level of the 2nd thoracic segment.

The 3rd abdominal segment, *i. e.* the 2nd free segment, bears a transverse row of very fine spinules across the dorsal aspect about the middle of its length, and a row of somewhat coarser spinules runs along the posterior margin. The 4th abdominal segment is similarly armed, but the spinules of the posterior row are not so well developed as in the preceding segment. The anal operculum (Text-fig. 1, B) is crossed dorsally by a row of minute spinules, and the posterior margin is armed, as in *L. coronata*, with a large median spine, that reaches beyond the level of the tips of the furcal rami; on either side of this there arise first a delicate seta and then two smaller and sub-equal spines on each side; these latter spines are more delicate than those of *L. coronata* and arise at about the same level, owing to the posterior margin of the operculum being more "square-shouldered" and not so sloping.



TEXT-FIG. 1.—*Longipedia weberi* A. Scott. A, Female, dorsal view. B, Anal segment and furca. C, 2nd antenna. D, 2nd leg. E, 5th leg. F, Genital armature.

The 5th leg (Text-fig. 1, E) shows a close degree of similarity to the appendage figured by Brady (1880, pl. xxxiv, fig. 8), and attributed by him to *L. coronata*.

Distribution.—This species has now been taken in the Malay Archipelago (A. Scott), the Chilka Lake (Sewell), the Maldive Archipelago, in the Western Mediterranean and the coast of Normandy (Monard). A. Scott obtained his specimen from washings from dredged Invertebrata (depth 13 fathoms), whereas the examples from the Mediterranean, the Chilka Lake and the Maldives were taken in weed.

Longipedia scotti Sars.

Longipedia scotti, Sars, 1903–11, p. 11, pl. v, fig. 1.

Occurrence.—Nankauri Harbour, Nicobar Islands, in weed-washings; a single female.

Distribution.—Prior to the work of Sars (1903–11) this species was confused with *L. coronata* Claus, and in consequence it is impossible to determine its exact distribution. It has now been recorded from the English and Scottish coasts by several observers; Norman and T. Scott record it from the coast of Devon and Cornwall, and Sars obtained it on the coast of Norway. Gurney records it from the Suez Canal, and A. Scott obtained it in the " Siboga " collections from the Malay Archipelago. Its occurrence in the Nicobar Islands is therefore not unexpected.

Longipedia rosea Sars.

Longipedia rosea, Sars, 1903–11, p. 13, pl. v, 3; Sewell, 1924, p. 806, pl. xlviii, 2.

Occurrence.—Nankauri Harbour, Nicobar Islands, in weed-washings.

Distribution.—Nankauri Harbour (present record), Chilka Lake (Sewell), and the coast of Norway (Sars).

Genus *Canuella* T. and A. Scott.

Canuella, T. and A. Scott, 1893, p. 92; T. Scott, 1893, p. 200.

This genus was created by T. and A. Scott to accommodate the species *Canuella perplexa* T. and A. Scott, which is therefore the type of the genus; the 4th pair of legs are said to resemble those of *Longipedia* and therefore consist of three segments in both rami, and this is the case in the type species.

Thompson and A. Scott (1903) in their account of the Copepoda of the Ceylon Pearl Banks recorded the occurrence of *Canuella perplexa* T. and A. Scott, as well as three species of the genus *Sunaristes*, *S. inopinata* Thompson and A. Scott, *S. longipes* Thompson and A. Scott and *S. curticauda* Thompson and A. Scott. Subsequently A. Scott (1909) transferred these last three species to the genus *Canuella*; but, as he points out, the specimens of what he took to be examples of *curticauda* showed a division of the endopod of the 4th leg into three segments, whereas Thompson and A. Scott described their specimens as having only two segments in this ramus, and in consequence remark that " the fact that this species has the inner branch of the 4th pair of legs only 2-jointed may, sometime, necessitate its removal to a new genus ". A. Scott, however, concludes that " the illustrations given in the Supplementary Report VII ' On the Copepoda in Professor Herdman's Report to the Government of Ceylon on the Pearl Oyster Fisheries of the Gulf of Manaar' were taken from a single immature specimen, and are obviously unsatisfactory ". In the " Investigator " collections I have found examples that agree with Thompson and

A. Scott's form, in which the endopod of the 4th leg consists of only two segments, as well as others in which this ramus has the normal three segments, and I cannot agree with A. Scott that they are examples of the same species in different stages of development. I am convinced that they are two perfectly distinct species, and that whereas the one is a true *Canuella*, the other, with a two-jointed ramus, should be placed at least in a separate subgenus.

I therefore propose that the Genus *Canuella* (*sensu lato*) be subdivided into two subgenera, viz. *Canuella* (*sensu stricto*), in which the 4th swimming-leg possesses an endopod composed of three segments, and a new subgenus *Ellucana*, in which this ramus possesses only two segments. The subgenus *Canuella* will include the species, *C. perplexa* T. and A. Scott, *C. furcigera* Sars, *C. inopinata* Thompson and A. Scott, and *C. longipes* Thompson and A. Scott, as well as the form found by A. Scott (1909) in the Malay Archipelago, and included under the name *C. curticauda* Thompson and A. Scott; for this latter form a new name is required and I suggest *C. scotti* nom. nov. The subgenus *Ellucana* is at present represented by the species *Canuella* (*Ellucana*) *curticauda* Thompson and A. Scott, and a closely related species to which I have given the name *longicauda*.

Subgenus *Canuella* nov.

The endopod of 4th swimming leg is composed of three segments.

Canuella (*Canuella*) *furcigera* Sars.

Canuella furcigera, Sars, 1903–11, p. 18, pl. x; Sewell, 1924, p. 807, pl. xlix, fig. 1.

Occurrence.—I (1924) recorded the occurrence of this species in the Chilka Lake, and more recently further specimens have been obtained in the "Investigator" collections from Nankauri Harbour, Nicobar Islands.

Descriptive Notes.—The specimens from the Nicobar Islands are considerably larger than those previously taken in the Chilka Lake and closely approximate to Norwegian specimens.

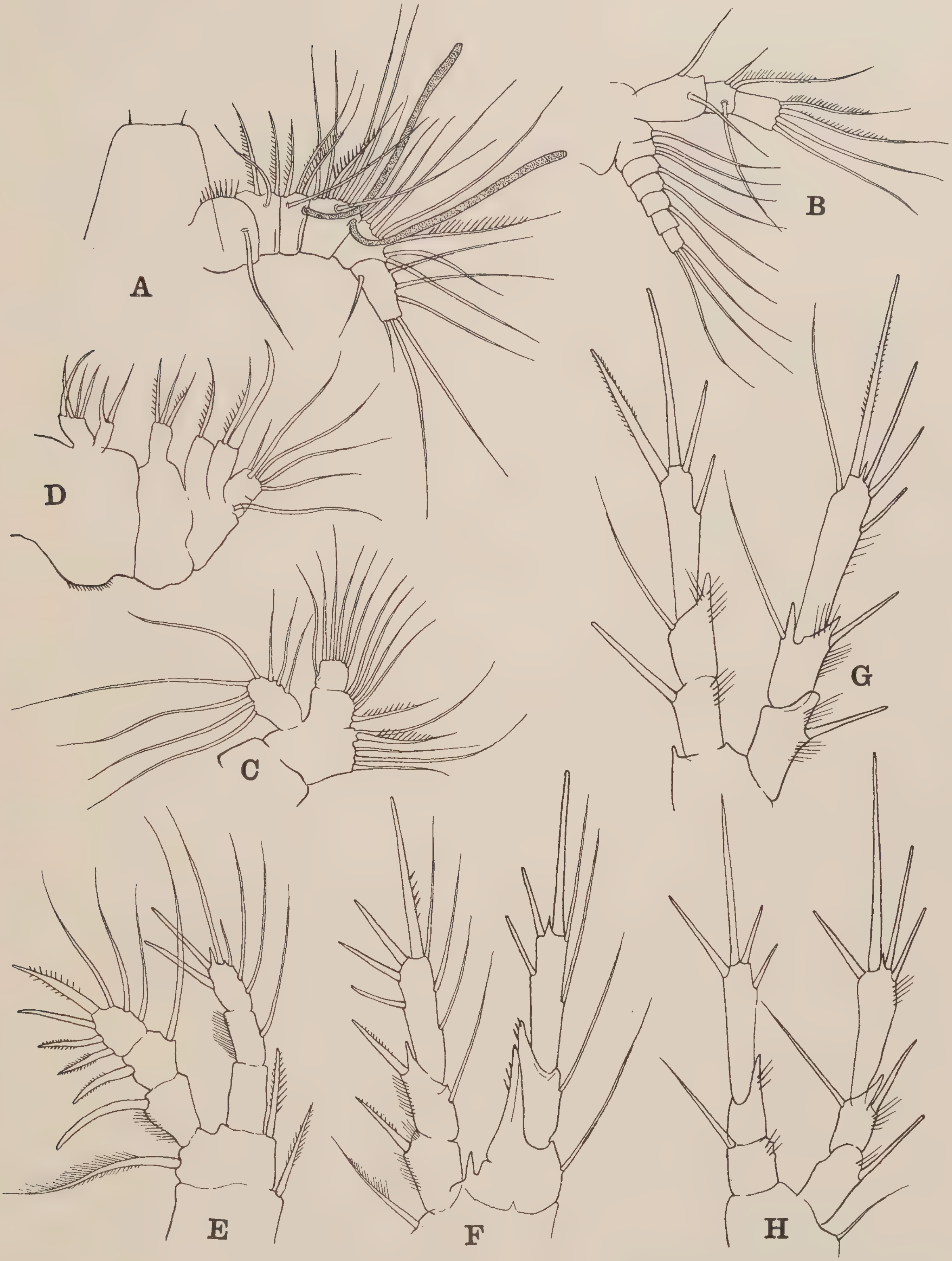
A single immature female was taken in the Nicobars, measuring 1·15 mm. in total length. In this individual the abdomen consists of only four segments, segments 4 and 5 not yet having become defined; the proportional lengths of these segments were as follows:

Abdominal segment	1.	2.	3.	4–5.	Furca.	
	20	18	13	12	37	= 100.

The proportional lengths of the anterior and posterior regions of the body were as follows:

Rostrum	6
Anterior region	54
Posterior region	40
	100

Of the two strong setæ arising from the distal end of the furcal ramus, the inner was equal in length to the whole body and the outer was about half this length. Along the outer margin of the furcal ramus ran a strengthening keel.



TEXT-FIG. 2.—*Canuella* (*Canuella*) *scotti* nom. nov. A, Rostrum and 1st antenna. B, 2nd antenna. C, Mandibular palp. D, 2nd maxilla. E, 1st leg. F, 2nd leg. G, 3rd leg. H, 4th leg.

Distribution.—This species has now been recorded from Nankauri Harbour, Nicobar Islands, and the Chilka Lake (Sewell), the Mediterranean Sea and Normandy coast (Monard) the English coast (Brady), the Scottish coast (T. Scott), the coast of Norway (Sars), the east coast of North America (Wilson), and off Greenland (Jespersen, Lang).

Canuella (*Canuella*) *scotti* nom. nov. (Text-fig. 2, A–H.)

Canuella curticauda, A. Scott, 1909, p. 197, pl. lxiv, figs. 1–6 [not *Canuella curticauda* (Thompson and A. Scott)].

Occurrence.—Nankauri Harbour, Nicobar Islands, in weed-washings.

Descriptive Notes.—A well-marked line of demarcation runs across the dorsal aspect of the genital segment of the abdomen. The furcal rami are of moderate length, being about twice the length of the anal segment.

The 1st antenna (Text-fig. 2, A) is composed of six segments, of which the distal is the longest; a well-developed sensory filament arises from both the 4th and 5th segments.

The 2nd antenna (Text-fig. 2, B) appears to possess three segments in the endopod and thus differs from *C. perplexa*, which according to Sars (1903–11, pl. viii) has only two. The outer ramus is slightly shorter than the inner, and is composed of six segments.

The palp of the 1st maxilla closely resembles that of *C. perplexa*.

The 2nd maxilla (Text-fig. 2, D) is stout, and strong and closely resembles that of *Sunaristes paguri* Hesse.

The swimming-legs (Text-fig. 2, E, F, G and H) agree with the figures given by A. Scott (*loc. cit.*, figs. 2, 3 and 4). The spine on the inner margin of basal 2 in the 1st leg (Text-fig. 2, E) reaches to half the length of endopod 2; the terminal segment of the endopod bears two spines and three setæ, and there is a spine-like prolongation of the segment at the base of the distal seta on the inner margin.

In the 2nd leg (Text-fig. 2, F) the proximal segment of the endopod is produced in a long spine-like process that reaches nearly as far as the corresponding projection of the 2nd segment.

In the 4th leg (Text-fig. 2, H) both rami are composed of three segments.

Distribution.—This species has been taken up to the present time in the Malay Archipelago in washings from dredged material from a depth of 13–32 metres and in the Nicobar Islands in washings from weed.

Subgenus *Ellucana* nov.

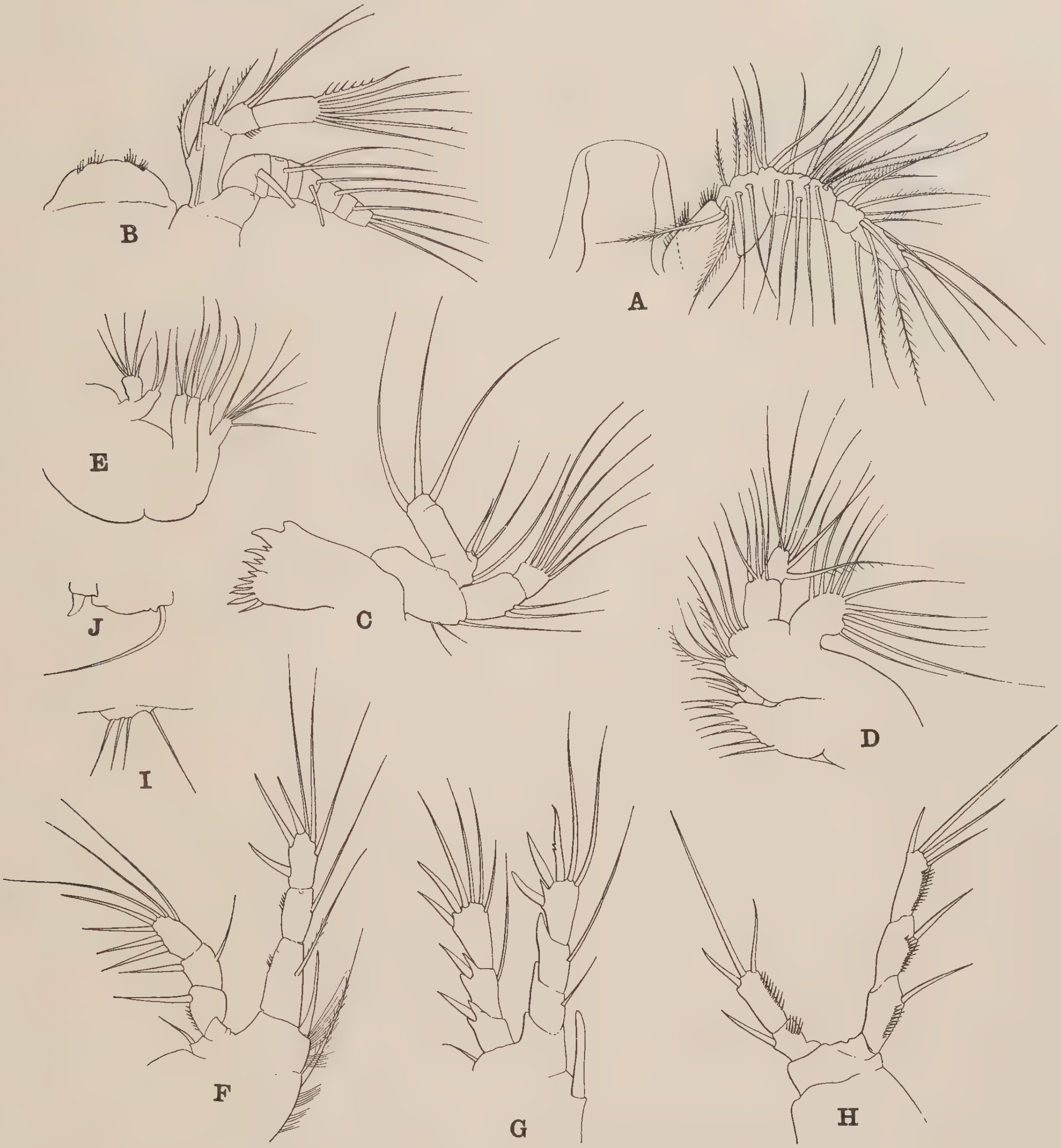
The endopod of the 4th swimming-leg is composed of only two segments.

Canuella (*Ellucana*) *longicauda* sp. nov. (Text-fig. 3, A–J.)

Occurrence.—Nankauri Harbour, Nicobar Islands, in weed-washings.

Descriptive Notes.—This form closely resembles the species that was originally described by Thompson and A. Scott from a female taken on the Ceylon Pearl Banks under the name *Sunaristes curticauda*. As already pointed out, A. Scott (1909, p. 197) later transferred this and two other forms from the same locality to the genus *Canuella*. There are, however, certain differences between the present form and *C. curticauda*

(Thompson and A. Scott) that seem to me to form sufficient grounds for considering it a new, though closely related species.



TEXT-FIG. 3.—*Canuella* (*Ellucana*) *longicauda* sp. nov. A, Rostrum and 1st antenna. B, Labrum and 2nd antenna. C, Mandible. D, 1st maxilla. E, 2nd maxilla. F, 1st leg. G, 2nd leg. H, 4th leg. I, 5th leg. J, Genital armature.

The general form of the body is the same as in *C. curticauda* but the furcal rami are considerably longer. The proportional lengths of the abdominal segments are as follows :

Abdominal segments 1–2.	3.	4.	5.	Furca.	
36	16	11	10	27	= 100

The furcal rami are two and a half times as long as the anal segment and are widely divergent.

The rostrum (Text-fig. 3, A) is broad and is bluntly rounded anteriorly.

The 1st antenna consists of five segments, but the line of division between segments 2 and 3 is incomplete ; Thompson and A. Scott state that in *C. curticauda* there are only four segments. The 3rd segment bears two sensory filaments.

The 2nd antenna (Text-fig. 3, B) possesses three clearly defined segments in the inner ramus, the distal being twice as long as the 2nd. The outer ramus is strong and is composed of seven segments, closely resembling the corresponding structure in the genus *Sunaristes*.

The mandible and 1st and 2nd maxillæ (Text-fig. 3, C, D and E) resemble those of *Sunaristes paguri* Hesse.

The swimming-legs closely resemble those of *Canuella* (*Ellucana*) *curticauda* Thompson and A. Scott. In the 1st leg (Text-fig. 3, F) basal 1 bears a long seta on its inner margin ; basal 2 bears a small delicate seta on its outer border, thus differing markedly from *Canuella* (*Canuella*) *scotti*, in which this seta is long and greatly thickened ; on the inner margin is a stout spine which reaches as far as the distal end of endopod 1. Both rami consist of three segments ; exopod 1 bears one large marginal spine but has no inner seta ; the outer margin is armed with a row of small spinules ; exopod 2 bears a smaller marginal spine and an inner seta ; exopod 3 carries three long marginal spines, a long end-spine and three setæ on the distal half of its inner margin. In the inner ramus endopods 1 and 2 each bear a single inner seta, and both segments are armed with a group of needle-like spines on the distal half of the outer border ; endopod 3 bears two spines on its outer margin and a third at the distal end, and three setæ arise from the distal half of the inner border. In *C. curticauda* Thompson and A. Scott (1903, pl. iii, fig. 14) figure only two spines and three setæ on endopod 3.

In the 2nd leg (Text-fig. 3, G) the 1st basal segment bears a stout blunt spine that reaches to the middle of the proximal segment of the endopod ; basal 2 bears a delicate marginal seta on its distal outer angle ; both rami are three-jointed ; exopod 1 bears a marginal spine but has no inner seta ; exopod 2 bears both a marginal spine and an inner seta ; and exopod 3 is armed with two marginal spines and a long end-spine and bears three setæ at the distal inner angle. In the inner ramus endopods 1 and 2 each bear a single seta, and both segments, especially the second, are produced distally at the distal outer angle ; endopod 3 bears three stout spines, the most distal, arising from the distal margin, showing two small teeth about half-way along its length ; two setæ arise from the distal inner angle.

In the 4th (Text-fig. 3, H) swimming-leg the exopod consists of three segments, all of which are fringed along the outer margin with a row of needle-like spinules. Exopods 1 and 2 are each armed with a single marginal spine, but bear no inner seta ; exopod 3 bears four spines, of which the 3rd is long, nearly equalling in length the whole ramus. The endopod consists of only two segments, a feature that is characteristic of the subgenus ; endopod 1 bears a single spine-like seta on its inner margin ; and endopod 2 bears three spine-like setæ at its distal end, of which the middle is by far the longest ; both segments are fringed along the outer border with needle-like spinules.

The 5th leg (Text-fig. 3, I) is greatly reduced and is represented by a slight projection of the posterior margin of the segment, bearing a row of three setæ, while a fourth seta arises a little further externally.

Distribution.—Up to the present time this species has only been taken in weed-washings in Nankauri Harbour, Nicobar Islands.

Family Ectinosomidæ.

Genus *Ectinosoma* Boeck.

Ectinosoma melaniceps Boeck.

Ectinosoma melaniceps, Sars, 1903–11, p. 34, pl. xix, fig. 1 ; Sewell, 1924, p. 808, pl. xlviii, fig. 3 ; Monard, 1928*a*, p. 292, fig. iii, 1.

Occurrence.—Sta. 61, northern part of Arabian Sea, surface, Nankauri Harbour, Nicobar Islands.

Descriptive Notes.—Sars (*loc. cit.*, p. 34) describes the coloration of this species as being " greyish white, with a very conspicuous dark shade occupying the greater part of the cephalic segment " ; the examples from Nankauri Harbour, however, were of a pale yellow colour with a dark band across the genital segment of the abdomen. Monard (*loc. cit.*, p. 293) gives the colour as " jaunâtre ". It would thus appear that there may be considerable variation.

There seems to be little doubt that *E. melaniceps* Boeck and *E. australe* Brady (= *E. antarcticum* Giesbrecht) are synonyms. Sars (1905, p. 380) first called attention to the similarity of these forms, and I (1934, p. 93) was by no means certain that the Indian form taken in the Chilka Lake should not be referred to the Antarctic form ; in the same year Lang (1934, p. 4) has combined the two under the prior name *E. melaniceps*.

Distribution.—This species has a very wide distribution. It has been recorded from Nankauri Harbour, Nicobar Islands, the Calcutta Salt Lakes, the Chilka Lake (Sewell), the Arabian Sea, the Suez Canal (Gurney), the Mediterranean Sea (Monard, Brian), the British Isles (Brady, Scott), the coast of Norway (Sars), Hudson Bay, Grinnel Land (Monard), Franz-Josef Land (T. Scott) and Barents Sea (T. and A. Scott). If we accept Lang's view that *E. australe* Brady is a synonym, the distribution extends to the Antarctic Ocean (Brady) and the Pacific Ocean (Sars, Lang).

Genus *Pseudobradya* Sars.

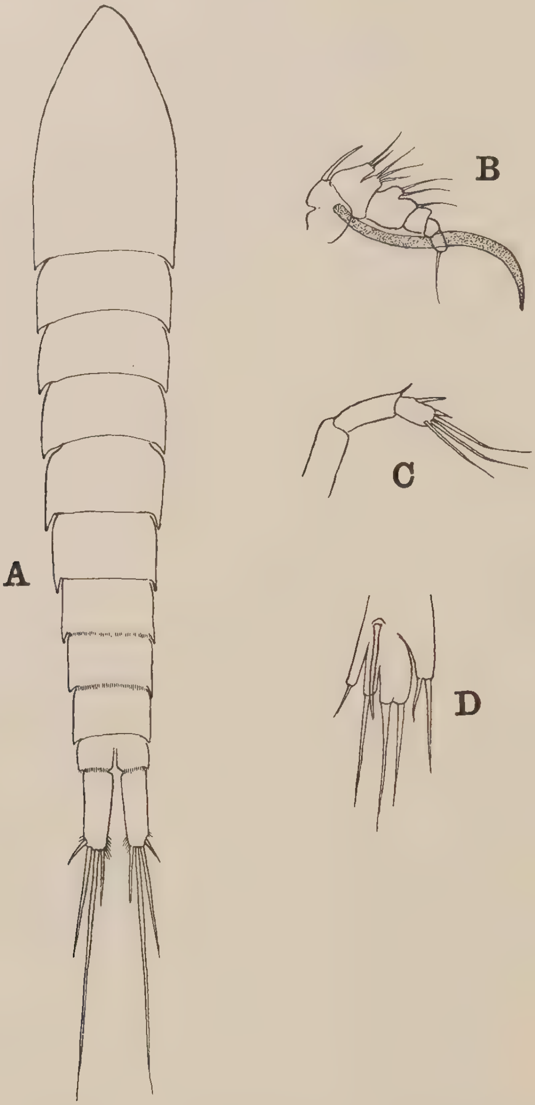
Pseudobradya similis (T. and A. Scott). (Text-fig. 4, A–D.)

Pseudobradya similis, Sars, 1903–11, p. 42, pl. xxiii, fig. 2.

Occurrence.—Addu Atoll, Maldive Archipelago, in weed-washings.

Descriptive Notes.—♀. Total length 0·527 mm. The proportional lengths of the anterior and posterior regions of the body are 53 to 47. The cephalon is fused with the 1st thoracic segment, and the combined mass is almost exactly equal in length to the next four segments. The general shape of the body (Text-fig. 4, A) is long and slender and tapers gradually towards the posterior end. There is a clearly marked division between the 1st and 2nd segments of the abodmen. Segments 2 and 3 of the abdomen are fringed along their posterior margins with a row of minute spinules, and similar rows occur along the posterior margin of segment 5 where this articulates with the furcal rami. The furcal rami are long, being nearly three times as long as wide, and they bear four setæ, of which the 2nd is by far the longest.

Distribution.—Up to the present time this species has only been recorded from the British Isles (T. and A. Scott), the coast of Norway (Sars) and the Maldive Archipelago.



Text-fig. 4.—*Pseudobradya similis* (T. and A. Scott). a, Female, dorsal view. b, 1st antenna. c, Endopod of 2nd antenna. d, 5th leg.

Genus *Microsetella* Brady and Robertson.

Microsetella norvegica (Boeck).

Microsetella norvegica, Sars, 1903–11, p. 44, pl. xxiv; van Breemen, 1908, p. 173, fig. 188*a–c*.
Microsetella atlantica, Giesbrecht, 1892, p. 550, pl. xliv, figs. 33, 34, 36, 39, 40, 42, 44, 45.

Occurrence.—Nankauri Harbour, Nicobar Islands. The Laccadive Sea—5° 56′ N., 76° 22′ E.

Distribution.—This species is widely distributed throughout all the three great oceans, its range extending from the Antarctic as far south as 66° 30′ S. to Franz-Josef and (T. Scott) in the Arctic.

Family Tachidiidæ.

Genus *Euterpina* Norman.

Euterpina acutifrons (Dana).

Euterpe acutifrons, Giesbrecht, 1892, p. 555, pl. xliv, figs. 16–31; van Breemen, 1908, p. 176, fig. 191*a–d*.
Euterpina acutifrons, Sars, 1921, p. 97, pl. lxviii; Monard, 1928*a*, p. 300, fig. iv, 3.

Occurrence.—Nankauri Harbour and Expedition Harbour, Nicobar Islands.

Distribution.—This species is widely distributed throughout the three great oceans; it has been recorded from the San Diego region of the Pacific, where it is abundant (Esterly), New Zealand (Brady, Farran), the Australian Barrier Reefs (Farran), the Malay Archipelago (A. Scott), the Aru Archipelago (Früchtl), the Ceylon Pearl Banks (Thompson and A. Scott), the Maldive Archipelago (Wolfenden), Durban Bay, East Africa (Brady), the Arabian Sea and Red Sea (Cleve, Thompson and A. Scott), the Suez Canal (Gurney), the Mediterranean Sea (Cleve, Giesbrecht, Thompson and A. Scott, Monard), the Adriatic Sea (Früchtl, Steuer), the North Atlantic Ocean (Cleve, Thompson, van Breemen, Farran), the South Atlantic Ocean (T. Scott, Farran), the coasts of Devon and Cornwall (Norman and T. Scott) and the coast of Norway (Sars).

Family Macrosetellidæ.

Genus *Macrosetella* A. Scott.

Macrosetella gracilis (Dana).

Setella gracilis, Giesbrecht, 1892, p. 559, pl. i, fig. 11; pl. xlv, figs. 1–15; van Breemen, 1908, p. 178, fig. 192*a–d*.

Occurrence.—

Sta. 56, South coast of Arabia, surface: 11 specimens.
Sta. 61, Northern area of Arabian Sea, surface; Nankauri Harbour and Expedition Harbour, Nicobar Islands.

Distribution.—This species appears to be widely distributed in the Plankton throughout the three great oceans; it has been recorded from the western Pacific Ocean, China Sea and Sunda Straits (Giesbrecht), the Barrier Reefs of Australia (Farran), the Malay Archipelago (A. Scott), the Aru Archipelago (Früchtl), the Pearl Banks of Ceylon (Thompson and A. Scott), the Maldive Archipelago (Wolfenden), Durban Bay, East Africa (Brady), the Arabian Sea and Red Sea (Cleve, Thompson and A. Scott), the Mediterranean Sea (Cleve, Thompson, A. Scott and Pesta), Chesapeake Bay on the American coast (Wilson), North and South Atlantic Ocean (Brady, T. Scott) as far south as 32°.

Genus *Miracia* Dana.

Miracia efferata Dana.

Miracia efferata, Giesbrecht, 1892, p. 563, pl. xlv, figs. 39–49.

Occurrence.—Nankauri Harbour, Nicobar Islands.

Distribution.—This species has been taken in the southern Pacific Ocean (Brady), the Arabian Sea (Thompson and A. Scott), the Gulf of Guinea (T. Scott), the Equatorial and North Atlantic (Giesbrecht).

Family Clytemnestridæ.

Genus *Clytemnestra* Dana.

Clytemnestra scutellata Dana.

Clytemnestra scutellata, Giesbrecht, 1892, p. 566, pl. i, fig. 9, pl. xlv, figs. 16–18, 21, 23, 24, 27–30, 32, 34–38; van Breemen, 1908, p. 179, fig. 193*a–c*; Sars, 1921, p. 100, pl. lxix.

Occurrence.—Sta. 61c, Northern part of Arabian Sea, surface; the Nicobar Islands.

Distribution.—This species is widely distributed; it has been taken in the Pacific Ocean (Giesbrecht), off New Zealand and the Great Barrier Reefs (Farran), the Malay Archipelago (Cleve), the Ceylon Pearl Banks (Thompson and A. Scott), the Maldive Archipelago (Wolfenden), the Suez Canal (Gurney), the Gulf of Guinea (T. Scott, recorded as *C. rostrata*, *vide* A. Scott, 1909, p. 232), Arabian Sea (Cleve, Thompson and A. Scott), the Mediterranean Sea (Claus, Pesta), the North Atlantic Ocean (T. Scott, van Breemen, Farran, Giesbrecht), and the coast of Norway (Sars).

Family Pontostratiotidæ.

Genus *Ægisthus* Giesbrecht.

Ægisthus aculeatus Giesbrecht.

Ægisthus aculeatus, Giesbrecht, 1892, p. 573, pl. xlvi, figs. 44, 45, 50, pl. xlix, figs. 1, 4, 5, 7–9, 11; van Breemen, 1908, p. 181, fig. 195 *a*, *b*.

Occurrence.—" Investigator " Station 682, Laccadive Sea, 10° 26′ N., 74° 32′ 30″ E., surface; a single female.

Distribution.—The Pacific Ocean (Giesbrecht), the Malay Archipelago (A. Scott), the Laccadive Sea (present record), the North Atlantic Ocean (van Breemen).

Ægisthus mucronatus Giesbrecht.

Ægisthus mucronatus, Giesbrecht, 1892, p. 573, pl. xlvi, figs. 46–49, 51; pl. xlix, figs. 2, 3, 6 and 10; van Breemen, 1908, p. 183, fig. 197*a–c*.
Ægisthus longirostris, T. Scott, 1894, p. 104, pl. xi, figs. 31–44.

Occurrence.—" Investigator " Sta. 682, Laccadive Sea, 10° 26′ N., 74° 32′ 30″ E., surface; one female.

Distribution.—The Pacific Ocean (Giesbrecht), the Malay Archipelago (A. Scott), the Laccadive Sea (present record), the coast of South Africa (Cleve), the Gulf of Guinea (T. Scott), the Massachusetts coast of North America (Wilson), the North Atlantic Ocean (Farran, Thompson), the North Sea (van Breemen).

Family Peltidiidæ.

Genus *Peltidium* Philippi.

This genus appears to be very well represented in Indian waters, no less than ten species having been recorded, namely:

Peltidium angulatum Thompson and A. Scott.
P. aurivillii (Cleve).
P. elegans Wolfenden.

P. exiguum A. Scott.
P. intermedium A. Scott.
P. minutum A. Scott.
P. ovale Thompson and A. Scott.
P. perplexum Thompson and A. Scott.
P. serratum Thompson and A. Scott.
P. speciosum Thompson and A. Scott.

Peltidium ovale Thompson and A. Scott. (Text-fig. 5, A–G.)

Peltidium ovale, Thompson and A. Scott, 1903, p. 273, pl. xiii, figs. 1–6.

OCCURRENCE.—Addu Atoll, Maldive Archipelago, in weed-washings; a single specimen. Nankauri Harbour, Nicobar Islands, in a tow-netting.

DESCRIPTIVE NOTES.—♀. Total length, 1·5 mm.; breadth, 0·89 mm.

Each segment of the body (Text-fig. 5, A) is raised into a claw-like hump in the mid-dorsal line.

The 1st antenna (Text-fig. 5, B) consists of the usual six segments, that have the following proportional lengths:

Segment	1.	2.	3.	4.	5.	6.
	29	29	19	6	6	11 = 100

Segments 3 and 4 each bear a long sensory filament.

In the 2nd antenna (Text-fig. 5, C) the exopod appears to consist of three segments. Segments 1 and 2 each bear a seta at the distal end and the very short terminal segment carries three setæ. Thompson and Scott, in their original account, appear to have confused the two rami of this appendage, for they describe the outer ramus as having only two joints and the inner three, whereas the reverse is the case.

DISTRIBUTION.—Up to the present time this species has only been taken in the Nicobar Islands, the Ceylon Pearl Banks and the Maldive Archipelago.

Peltidium intermedium A. Scott.

Peltidium intermedium, A. Scott, 1909, p. 203, pl. lxv, figs. 6–10.

OCCURRENCE.—Addu Atoll, Maldive Archipelago, in weed-washings; a single female.

DESCRIPTIVE NOTES.—The total length of this specimen was 1·26 mm., and the greatest breadth, which was situated at the posterior end of the cephalic segment, was 0·81 mm.; this is considerably larger than Scott's specimen, which had a total length of only 0·87 mm.

DISTRIBUTION.—This species has only been recorded from the Malay Archipelago (Scott) and the Maldive Archipelago. Scott's specimen was taken in a surface tow-netting.

Peltidium exiguum A. Scott.

Peltidium exiguum, A. Scott, 1909, p. 204, pl. lxv, figs. 11–15.

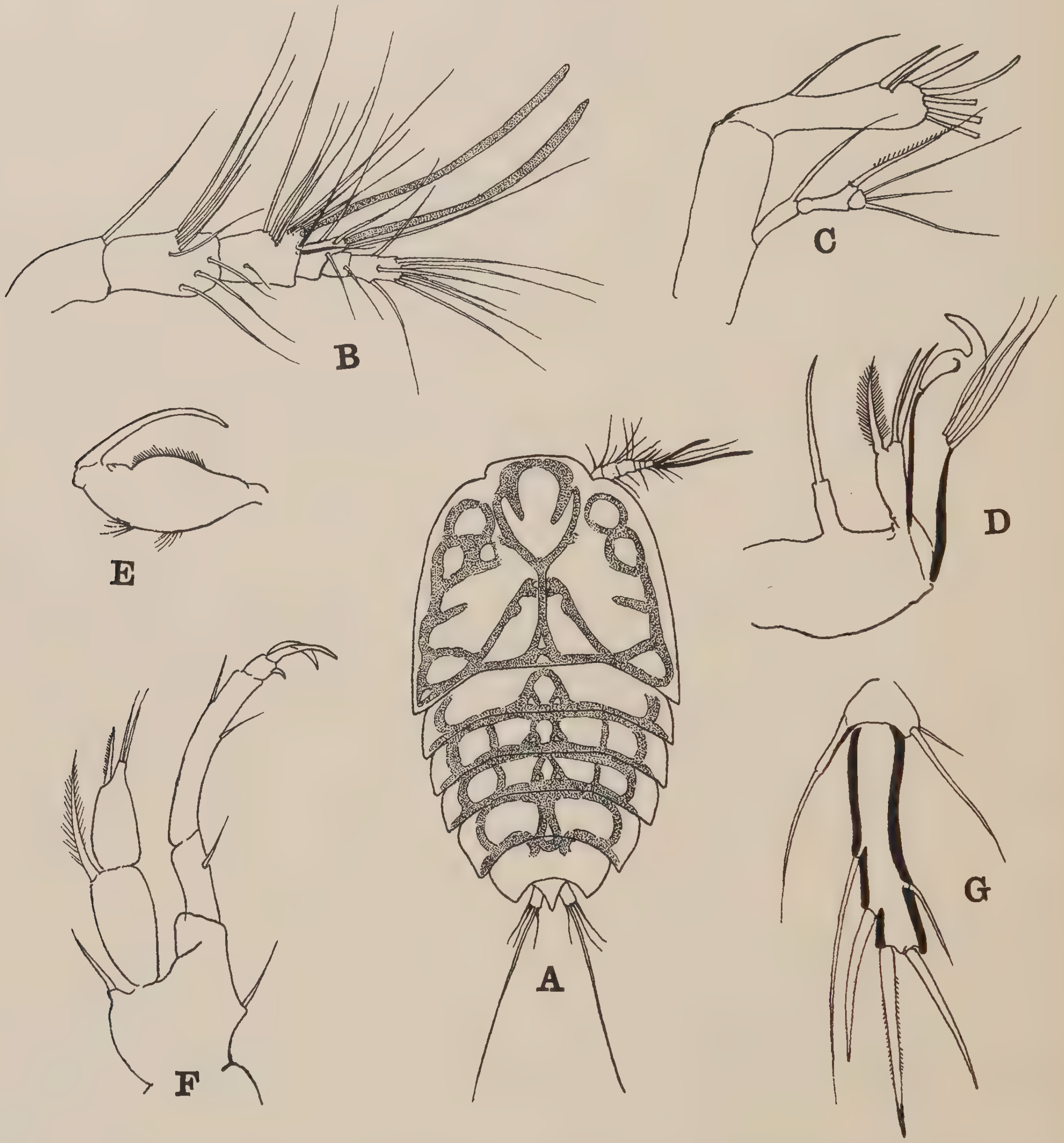
OCCURRENCE.—Addu Atoll, Maldive Archipelago, in weed-washings; a single female.

DISTRIBUTION.—The Malay Archipelago (Scott) and the Maldive Archipelago. Scott's specimen was from material from dredged invertebrata.

Peltidium minutum A. Scott.

Peltidium minutum, A. Scott, 1909, p. 205, pl. lxv, figs. 16–20.

Occurrence.—Addu Atoll, Maldive Archipelago, in weed-washings ; a single female.



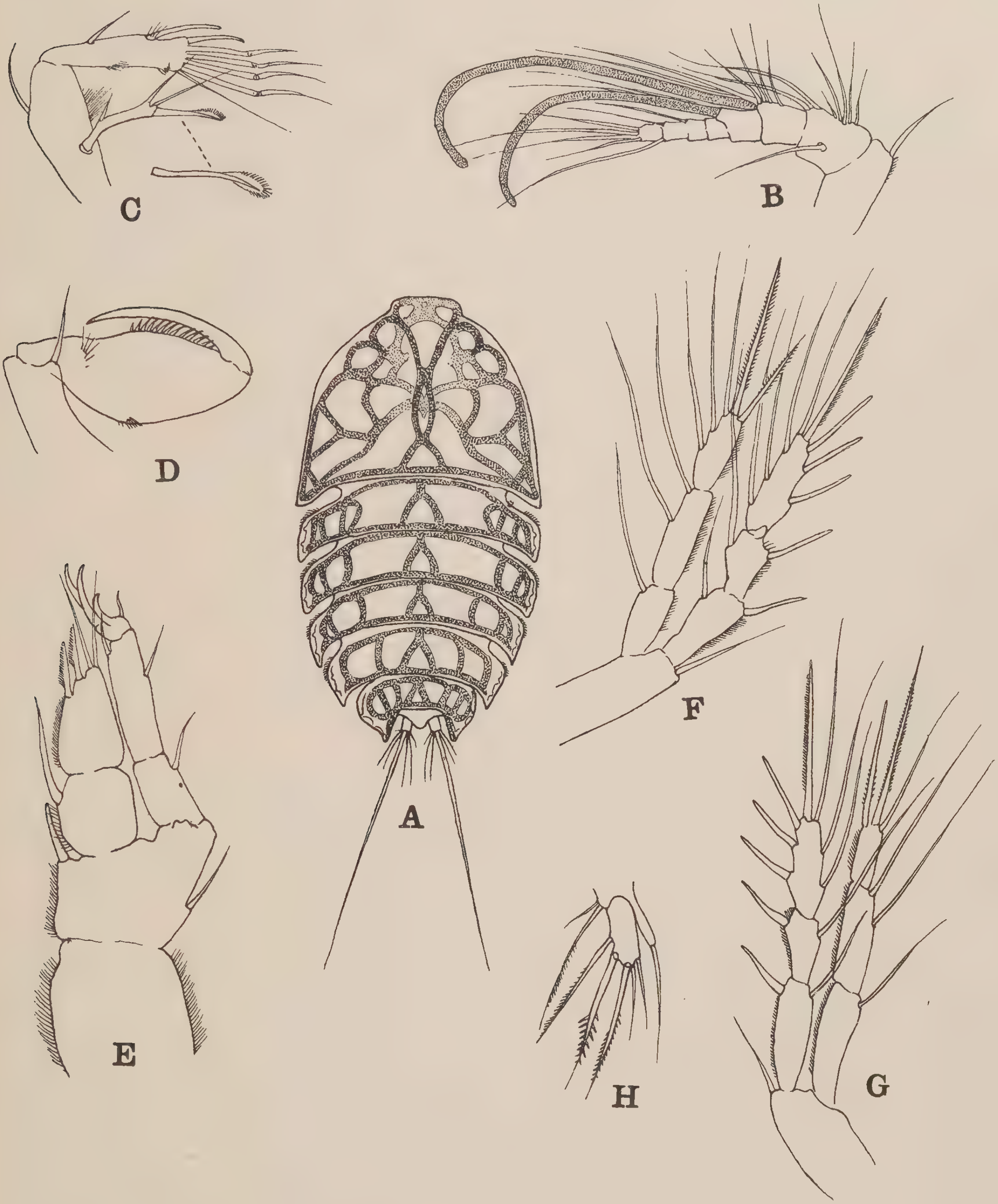
Text-fig. 5.—*Peltidium ovale* Thompson and A. Scott. a, Female, dorsal view. b, 1st antenna. c, 2nd antenna. d, 2nd maxilla. e, Maxilliped. f, 1st leg. g, 5th leg.

Distribution.—The Malay Archipelago (Scott) and the Maldive Archipelago. Scott's specimen was in washings from dredged Invertebrata.

Peltidium maldivianum sp. nov. (Text-fig. 6, a–h.)

Occurrence.—Addu Atoll, Maldive Archipelago, in weed-washings ; a single female.

Descriptive Notes.—♀. Total length, 0·65 mm. The general shape of the body (Text-fig. 6, A) is oval, the greatest breadth being at the level of the 1st thoracic segment.



Text-fig. 6.—*Peltidium maldivianum* sp. nov. A, Female, dorsal view. B, 1st antenna. C, 2nd antenna. D, Maxilliped. E, 1st leg. F, 3rd leg. G, 4th leg. H, 5th leg.

The rostrum is truncate. The distal ends of the cephalic and thoracic segments are pointed. The genital segment is rounded posteriorly, and the process extends back nearly to the level of the tips of the furcal rami.

The 1st antenna (Text-fig. 6, B) consists of eight segments, that have the following proportional lengths :

Segment 1.	2.	3.	4.	5.	6.	7.	8.
24	22	16	12	6	6	7	7 = 100

Segments 7 and 8 appear to be only partially separated.

The 2nd antenna (Text-fig. 6, C) has the usual form, but the terminal seta arising from the extreme end of the exopod is modified, being broadened or spatulate in the distal third, and the margin of this expanded area is fringed with fine spinules.

The maxilliped (Text-fig. 6, D) forms the usual grasping organ, and the inner margin of the hand is armed with a row of curved spines.

The 1st leg (Text-fig. 6, E) has the form characteristic of the genus. The exopod arises from a short prolongation of the 2nd basal joint. Basal 2 bears a seta at about the junction of the middle and distal thirds of the outer margin, and a spine springs from the distal inner angle ; the inner border is fringed with hairs. The exopod consists of three segments, of which the 2nd is about twice the length of the 1st, and the 3rd is quite short ; each segment bears a spine on its outer margin ; the 3rd segment bears distally three unequal curved claw-like spines. The endopod consists of only two segments and reaches nearly to the end of the 2nd segment of the exopod ; the segments are flattened and lamellar in character ; segment 1 bears an inner seta, and segment 2 bears two delicate setæ at the distal end and two serrated spines on the inner margin near the distal end.

The 2nd–4th legs are each composed of three-jointed rami of the usual type ; the 2nd segment of the endopod bears two inner setæ. In the 3rd leg (Text-fig. 6, F) the terminal segment of the endopod bears two serrated spines at the distal end and three setæ on the inner margin. In the 4th leg (Text-fig. 6, G) two serrated spines spring from the distal end, but there is only one seta on the inner margin near the distal end. In all three legs the endopod and exopod are of nearly equal length.

The 5th leg (Text-fig. 6, H) consists of a basal portion that is produced externally in a long pedicle that carries a single seta, while two very unequal setæ spring from the distal inner angle ; the terminal segment is about two and a half times as long as wide, and bears two delicate setæ at the distal end and three spine-like setæ on the inner margin ; of these latter, the middle one is strongly serrated along the distal half of its length.

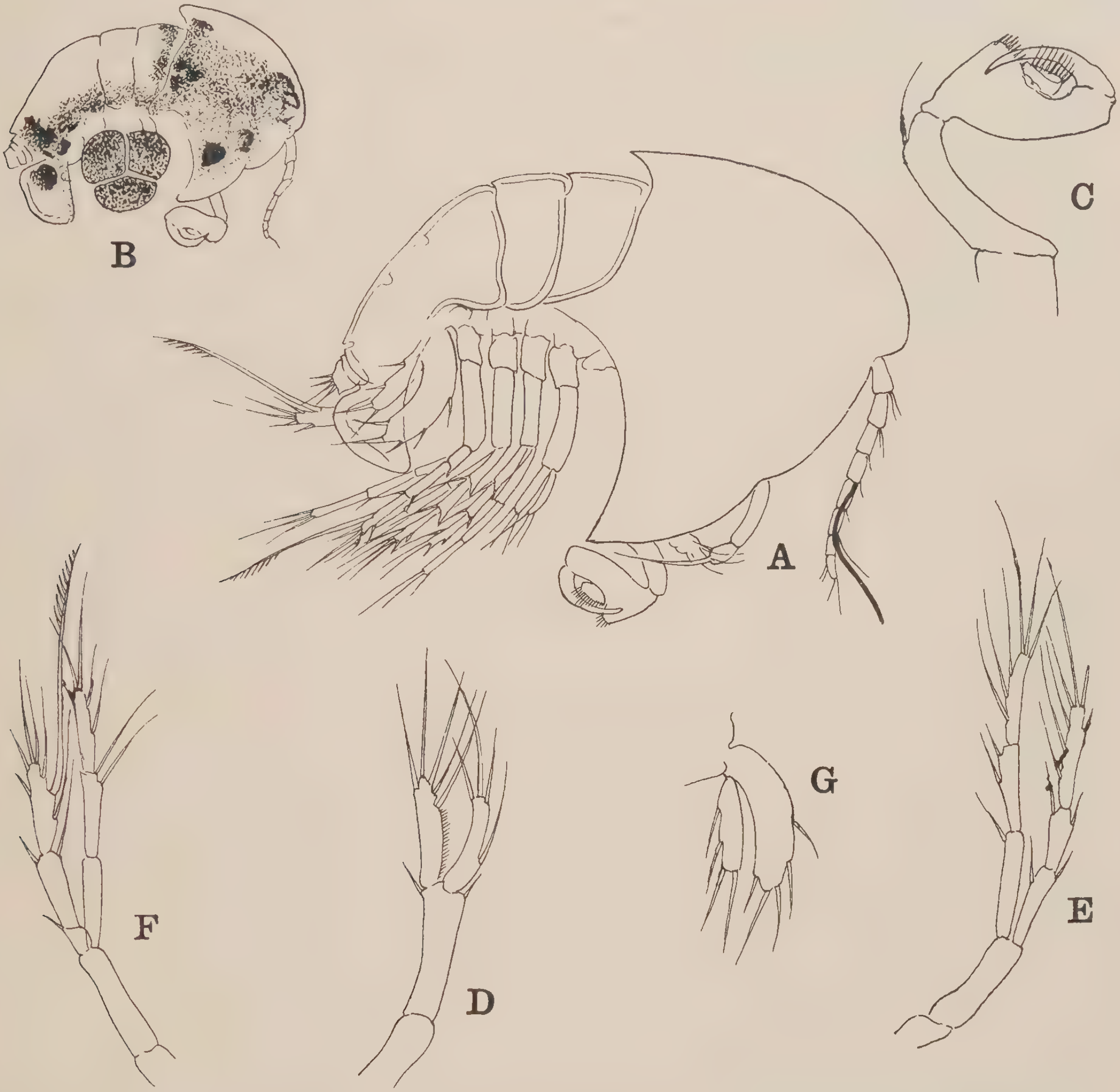
This species comes very near to *Peltidium elegans* Wolfenden (1906, p. 1033, pl. xcix, figs. 21–27), but in that species the 1st antenna consists of nine segments. In both species the exopod of the 2nd antenna bears a modified spine distally. The present species differs, however, in that the 2nd basal segment of the 1st leg bears an ordinary seta on its inner border and not a club-like spine, and the distal segment of the 5th leg bears only five setæ, three on the outer margin and two distally, whereas *P. elegans* has an additional seta on the outer margin of the segment, making six in all. The character of the 5th foot in this species closely resembles that of *P. exiguum* A. Scott and *P. minutum* A. Scott.

Distribution.—The Maldive Archipelago.

Family Tegastidæ.

Originally this family consisted of only a single genus, *Tegastes* Norman (= *Amymone* Claus), but Sars (1903–11, p. 72) created a second genus, *Parategastes,* and more recently

Monard (1928*a*, p. 324) has added a third, *Syngastes*. In 1903 Thompson and A. Scott recorded the occurrence on the Ceylon Pearl Banks of five species, namely *Tegastes nigrans* (T. and A. Scott), and *imthurni* Thompson and A. Scott, *donnani* Thompson and A. Scott, *twynami* Thompson and A. Scott and *chalmersi* Thompson and A. Scott, all of which were referred to the genus *Tegastes*. Sars (1903–11, p. 73), when creating the new genus *Parategastes*, transferred to it *sphærica*, *imthurni*, *donnani* and *twynami*; and Monard (1928*a*, p. 336), by the creation of the genus *Syngastes*, has rendered it necessary to transfer *imthurni*, *donnani* and *twynami* to this new genus.



TEXT-FIG. 7.—*Tegastes minutus* sp. nov. A, Female, lateral view. B, Sketch showing the distribution of pigment. C, Maxilliped. D, 1st leg. E, 3rd leg. F, 4th leg. G, 5th leg.

Genus *Tegastes* Norman.

Tegastes minutus sp. nov. (Text-fig. 7, A–G.)

OCCURRENCE.—Addu Atoll, Maldive Archipelago, in weed-washings; a single female.

DESCRIPTIVE NOTES.—Total length, 0·29 mm. The anterior region of the body

(Text-fig. 7, A) is large and is produced ventrally in a pointed process. The whole body is dotted over, especially on the cephalo-thorax and the ventro-lateral parts of the following segments, with scattered patches of dark brown pigment.

Behind the cephalosome are two separate segments, and then follows a mass, composed of three fused segments. The genital segment is produced ventrally in a triangular plate with rounded angles.

The 1st antenna is composed of eight segments, of more or less equal length; the 4th bears a large sensory filament.

The maxilliped (Text-fig. 7, C) is strongly developed.

The 1st leg (Text-fig. 7, D) consists of a basal portion of two elongate slender segments, the distal of which bears a small seta at both the inner and outer distal angles; each ramus is composed of a single segment.

The 2nd–4th legs each have three-jointed exopods and endopods.

In the 4th leg (Text-fig. 7, F) the 2nd inner seta of exopod 3 is very strongly developed and is serrated along its distal third.

In the 5th leg (Text-fig. 7, G) the inner lobe is larger than the outer and bears three setæ on its inner margin, one distally and a smaller one on its inner border near the distal end; the outer lobe is about three times as long as broad, and bears two setæ on its outer margin and two on the truncated distal end.

In spite of its very small size this specimen was sexually mature and was bearing three ova.

DISTRIBUTION.—Up to the present time this species has only been taken in the Maldive Archipelago.

Genus *Syngastes* Monard.

Syngastes, Monard, 1928*a*, p. 336.

As a result of Monard's work this genus now comprises seven species, namely:

Syngastès chalmersi (Thompson and A. Scott),
S. clausi (Thomson),
S. cornalinus Monard,
S. donnani (Thompson and A. Scott),
S. imthurni (Thompson and A. Scott),
S. macrognathus Monard,
S. twynami (Thompson and A. Scott),

to which must be added an eighth, *Syngastes indicus* sp. nov. These species fall into three groups according to the number of segments in the 1st antenna. *Syngastes clausi*, *S. imthurni* and *S. twynami* all possess in the female six segments; *S. macrognathus* and *S. cornalinus* have only five; and in *S. chalmersi*, *S. donnani* and *S. indicus* there are seven.

In both *S. clausi* and *S. imthurni* the 3rd segment of the 1st antenna is only about half the length of the 2nd, and the characters of the 4th swimming-leg appear to be identical. As I (1924, p. 815) have previously pointed out, I believe that the Ceylon form, *S. imthurni* (Thompson and A. Scott), is identical with the form described by Thomson (1883, p. 98, pl. v, figs. 1–8) from New Zealand under the name *Amymome* (sic) *clausi*.

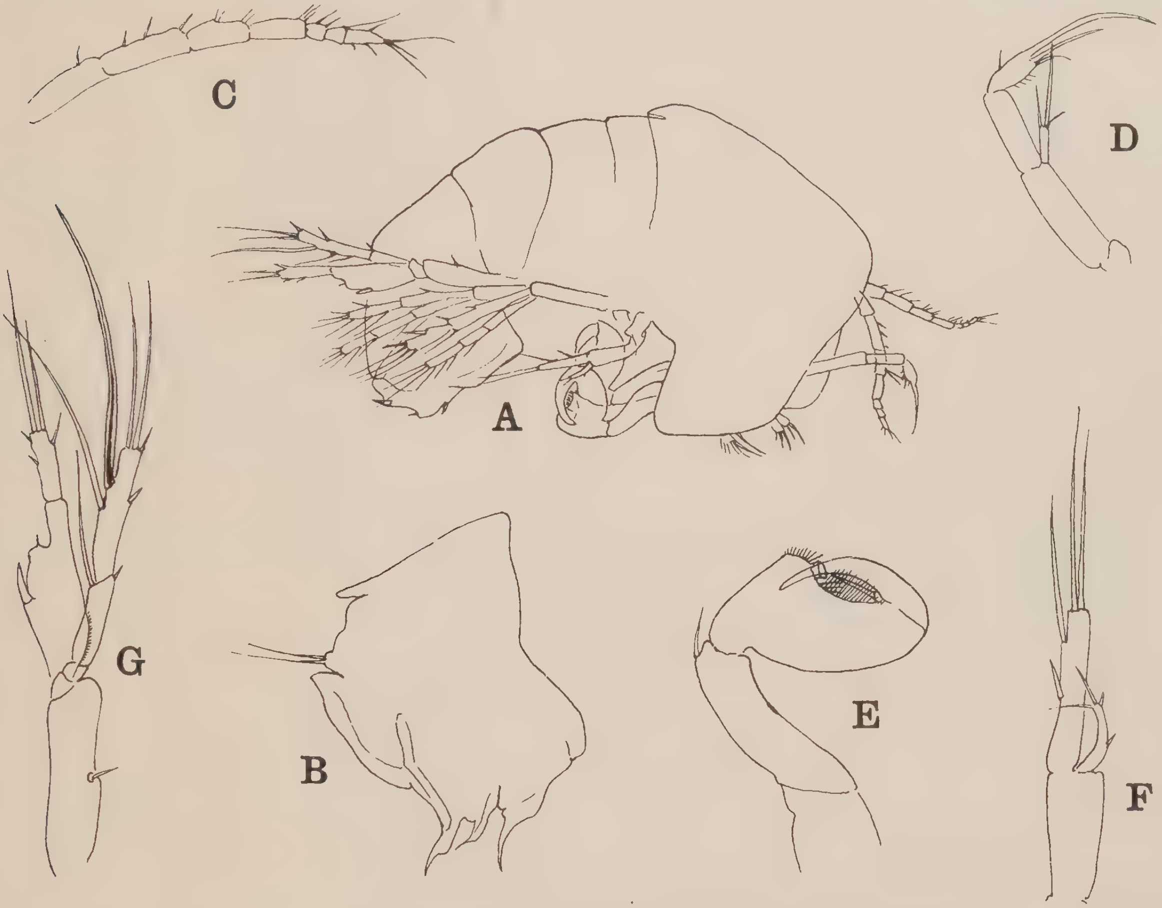
The genus appears to be limited in its distribution to the south-western region of the Pacific, the Indian Ocean and the Mediterranean Sea.

Syngastes imthurni (Thompson and A. Scott).

Tegastes imthurni, Thompson and A. Scott, 1903, p. 258, pl. iv, figs. 1–9.
Amymome (sic) *clausi*, Thomson, 1883, p. 98, pl. v, figs. 1–8.

Occurrence.—Addu Atoll, Maldive Archipelago, in weed-washings ; a single female.

Descriptive Notes.—As I have already mentioned, I am of the opinion that the New Zealand form, *S. clausi*, is identical with the Ceylon form, *S. imthurni*. Thomson's figures appear in certain details to be inaccurate and misleading, so that the actual proof of identity must wait till further material from both sources can be carefully examined. Should the two forms ultimately prove to be identical, Thomson's name, *clausi*, will have priority.



Text-fig. 8.—*Syngastes indicus* sp. nov. a, Female, lateral view. b, Abdomen of female. c, 1st antenna. d, 2nd antenna. e, Maxilliped. f, 1st leg. g, 4th leg.

Distribution.—From the Ceylon Pearl Banks and the Maldive Archipelago and probably also from the New Zealand coasts.

Syngastes indicus sp. nov. (Text-fig. 8, a–g.)

Occurrence.—Addu Atoll, Maldive Archipelago, in weed-washings ; a single female.

Descriptive Notes.—♀. Total length, 0·47 mm. The body (Text-fig. 8, a) is compressed laterally and the cephalosome and genital segments are deep; the posterior abdominal segments are small and barely distinguishable.

The 1st antenna (Text-fig. 8, C) is composed of seven segments, that have the following proportional lengths:

Segment 1.	2.	3.	4.	5.	6.	7.
27	27	14	12	5	5	10 = 100

In the 2nd antenna (Text-fig. 8, D) the exopod is very short and bears three setæ distally; the endopod is composed of two segments, of which the distal is about half the length of the proximal.

The maxilla is strongly developed.

In the 1st leg (Text-fig. 8, F) the exopod is remarkably short, being only about half the length of the endopod; each ramus consists of only a single segment.

In the 2nd and 3rd legs the exopod consists of two segments, the proximal of which appears to have been formed by the fusion of segments 1 and 2; the line of fusion is marked by the presence of a small marginal spine; the endopod consists of the usual three segments.

In the 4th leg (Text-fig. 8, G) the exopod consists of three segments, the 1st being very small; the distal segment bears two small external marginal spines, and a long end-spine that is equal in length to the segment; the 2nd inner seta is very strongly developed. In the endopod the proximal portion is swollen, and this portion appears to be composed of the 1st segment and the proximal part of the 2nd; from the inner border of the swelling, a little beyond the middle of its length, arises a short, stout spine, and a small delicate seta is situated at its distal angle.

The character of the 1st leg serves to distinguish this species from all others in the genus that have hitherto been described.

Distribution.—The Maldive Archipelago.

Family Porcellidiidæ.

Genus *Porcellidium* Claus.

Up to the present time five species belonging to this genus have been recorded from Indian waters, namely:

Porcellidium acuticaudatum Thompson and A. Scott.
P. brevicaudatum Thompson and A. Scott.
P. fimbriatum Claus.
P. ravanæ Thompson and A. Scott.
P. tuberculatum Wolfenden.

Porcellidium fimbriatum Claus.

Porcellidium fimbriatum, Sars, 1903–11, p. 76, pls. xliv, xlv; Thompson and A. Scott, 1903, p. 275.
? *Porcellidium fulvum*, Thomson, 1883, p. 107, pl. vi, figs. 10, 11, pl. vii, figs. 8–13.

Occurrence.—Nankauri Harbour, Nicobar Islands, in a tow-netting, surface.

Distribution.—This species appears to be widely distributed. It has been recorded from the Norwegian coast (Sars), the British Isles (Brady, Norman and T. Scott), the

Mediterranean Sea (Claus, Monard and Brian), the Normandy coast (Monard), the Ceylon Pearl Banks (Thompson and A. Scott). the Nicobar Islands, and the Aru Archipelago (Früchtl).

The form described by Thomson (1883) from New Zealand under the name *P. fulvum* shows a close degree of resemblance to *P. fimbriatum*, but neither the description nor the figures are sufficiently detailed to permit of a definite identification.

Porcellidium acuticaudatum Thompson and A. Scott.

Porcellidium acuticaudatum, Thompson and A. Scott, 1903, p. 275, pl. xii, figs. 15–18; Gurney, 1927*c*, p. 494, fig. 128.

Occurrence.—Addu Atoll, Maldive Archipelago, in weed-washings; a single female.

Descriptive Notes.—♀. Total length, 0·80 mm. Maximum breadth, 0·54 mm. The present specimen is therefore somewhat larger than Thompson and A. Scott's examples, which measured only 0·6 mm. in length.

The 1st antenna consists of six segments, which have the following lengths:

	Segment 1.	2.	3.	4.	5.	6.
	20	30	20	15	9	6 = 100
Thompson and A. Scott .	26	26	18	14	9	7 = 100

The length of the 1st segment appears to be much shorter in the present example than in those from Ceylon; for convenience of reference I have calculated Thompson and Scott's measurements as parts of 100, and have given them above.

As both Thompson and A. Scott (1903) and Gurney (1927*c*) have pointed out, the chief distinguishing character of this species is the acutely pointed furcal rami; Thompson and A. Scott (*loc. cit.*, pl. xii, fig. 18) show only a single spine-like seta arising from the outer margin just where this makes an angle; Gurney (*loc. cit.*, fig. 128*a*), however, shows two small setæ arising at this point, and in my example there was a group of three unequal spine-like setæ, of which the middle one was the longest.

The apex of the 5th leg is broadly rounded.

Distribution.—The Ceylon Pearl Banks (Thompson and A. Scott), the Maldive Archipelago, and the Suez Canal (Gurney).

Porcellidium tuberculatum Wolfenden.

Porcellidium tuberculatum, Wolfenden, 1906, p. 1034, pl. xcix, figs. 28–30.

Occurrence.—Nankauri Harbour, Nicobar Islands, in weed-washings; a single female.

Descriptive Notes.—♀. The 1st antenna consists of six segments that have the following proportional lengths:

Segment 1.	2.	3.	4.	5.	6.
22	31	18	13	9	7 = 100

Gurney (1927*c*, p. 495) remarks that "*P. tuberculatum* Wolfenden has the same red colour and exactly similar furcal rami (as *P. acuticaudatum*) but differs in the body being much rounder. Wolfenden does not say if he had more than one specimen, or if the female described was fully mature, but it seems very possible that his form was an immature stage of *P. acuticaudatum*".

In the example that I attribute to this species, the 5th legs were much less bluntly rounded at the apex than in *P. acuticaudatum* and the furcal rami showed a much less marked angle in the outer margin, this being somewhat rounded, while the three setæ that arise from the distal part of this outer margin differed in character, the proximal being a short serrated spine, the second a long and delicate seta and the third being very small.

In these circumstances it appears to me to be preferable to regard this as a separate species.

Distribution.—The Nicobar Islands (present record) and the Maldive Archipelago (Wolfenden).

Family Harpacticidæ.

Genus *Harpacticus* M. Edwardes.

I find this genus one of great difficulty, for in the first place the structural differences between the so-called species are often extremely small, and secondly, various observers have described different forms under the same specific name. This confusion regarding even the well-known species has been pointed out by Sars (1903–11, p. 52), who maintains that the form described by Giesbrecht under the name *Harpacticus chelifer* is in reality an example of *Harpacticus gracilis* Claus; Brady also, it seems, has confused the two species, and to make the matter still more confusing the form that Sars believed to be *H. gracilis* Claus is, according to Monard (1928, p. 306), some other species. In these circumstances it seems impossible, without an examination of the types, if such still exist, to be certain of one's diagnosis, and all identifications in this genus must be regarded as provisional.

Harpacticus littoralis Sars.

Harpacticus littoralis, Sars, 1903–11, p. 363, Suppl. pl. 8; Sewell, 1924, p. 810, pl. l, fig. 1.

Occurrence.—Nankauri Harbour, Nicobar Islands, in weed-washings.

Distribution.—This species has been taken in the Nicobar Islands, and the Chilka Lake (Sewell), in Chesapeake Bay (Wilson), and on the coast of Norway (Sars).

Harpacticus gracilis Claus.

Harpacticus gracilis, Claus, 1863, p. 135, pl. xix, fig. 20; Monard, 1928*a*, p. 306, fig. vii, 1.
? *Harpacticus gracilis*, Sars, 1903–11, p. 52, pl. xxx, fig. 1.

Occurrence.—Nankauri Harbour, Nicobar Islands, in weed-washings.

Descriptive Notes.—I have little doubt that this form corresponds with the species described by Claus under the above name and redescribed by Monard.

♀. The proportional lengths of the segments of the 1st antenna are given below, and for convenience of reference I have recalculated the measurements given by Monard as parts of 100:

Segment	1.	2.	3.	4.	5.	6.	7.	8.	9.
	20	13	19	23	7	7	4	3	4 = 100
(Monard) .	20	11	19	25	7	7	4	2	5 = 100

The 5th leg agrees closely with the figure given by Monard.

Distribution.—This species has been taken in the Nicobar Islands and in the Mediterranean Sea. If this form is the same as that described by Sars under the same name, then the distribution extends to Chesapeake Bay (Wilson), the British Isles (Brady), Roscoff (Monard), and the coast of Norway (Sars). Brian (1928*b*, p. 306) has, however, expressed doubts that the form described by Monard under the name *H. gracilis* Claus is actually that species. He remarks: " Forse la forma descritta da Monard col nome di *Harpacticus gracilis* dovrebbe essere considerata come nuova e come speciale al Mediterraneo e in questo caso sarebbe da cambiarle il nome." Owing to the confusion that has arisen regarding this and other species, a number of records of this species are somewhat doubtful; Brady (1910, p. 551) states that he has examined a specimen from Kerguelen that agreed exactly with Sars' description, and T. Scott (1899, p. 111, pl. viii, figs. 10–13) under the name *H. chelifer* has recorded a form from Franz-Josef Land that seems actually to be *H. gracilis*.

Harpacticus gracilis Claus, var. *orientalis* Sewell.

Harpacticus gracilis var. *orientalis*, Sewell, 1924, p. 811, pl. l, fig. 2.
Harpacticus gracilis, Gurney, 1927*c*, p. 492, fig. 127, A–F.

Occurrence.—Nankauri Harbour, Nicobar Islands. In Addu Atoll, Maldive Archipelago, in weed-washings.

Descriptive Notes.—A comparison of the description and figures given by Gurney (*loc. cit.*) with my original account of examples from the Chilka Lake seems to indicate beyond doubt that these two forms are identical. As Gurney points out (1927*c*, p. 494), " *Harpacticus gracilis* seems to be a variable and very widely-distributed species, and it seems possible that *H. clausi* A. Scott and *H. fucicolus* T. Scott may be forms of it ". I am not, however, prepared to agree with this latter suggestion, and prefer to regard them as separate, though closely allied species.

Distribution.—Up to the present time this form has only been recorded from the Indian Ocean and the Suez Canal.

Harpacticus clausi A. Scott. (Text-fig. 9, A–H, ♀; Text-fig. 10, A–I, ♂.)

Harpacticus clausi, A. Scott, 1909, p. 201, pl. lxi, figs. 9–14.

Occurrence.—Nankauri Harbour, Nicobar Islands, in weed-washings.

Descriptive Notes.—♀. Total length, 0·6 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 9, A) are as 61 : 39.

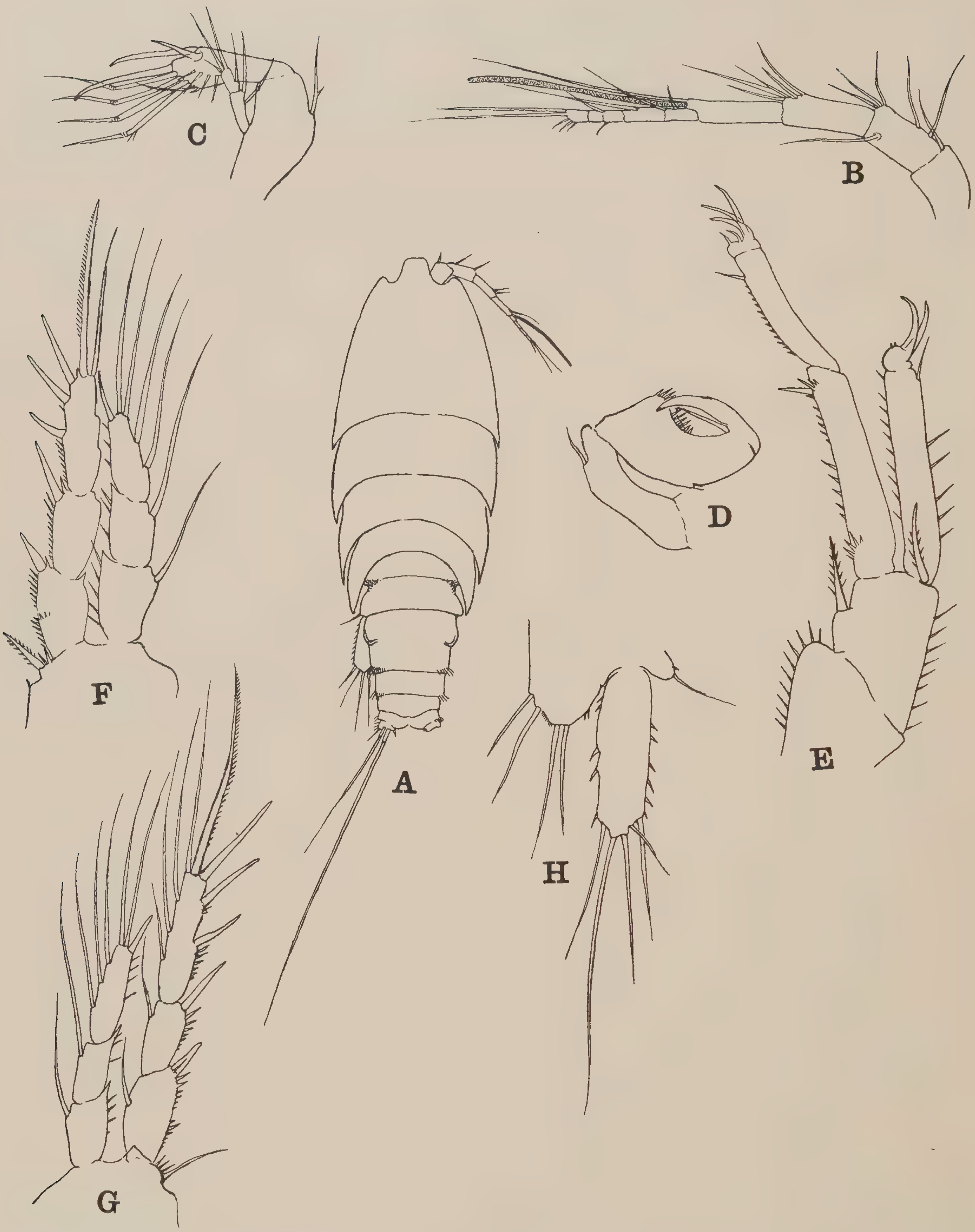
The proportional lengths of the various segments of the posterior region are as follows:

Segment	Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
	19	45	17	9	6	4 = 100

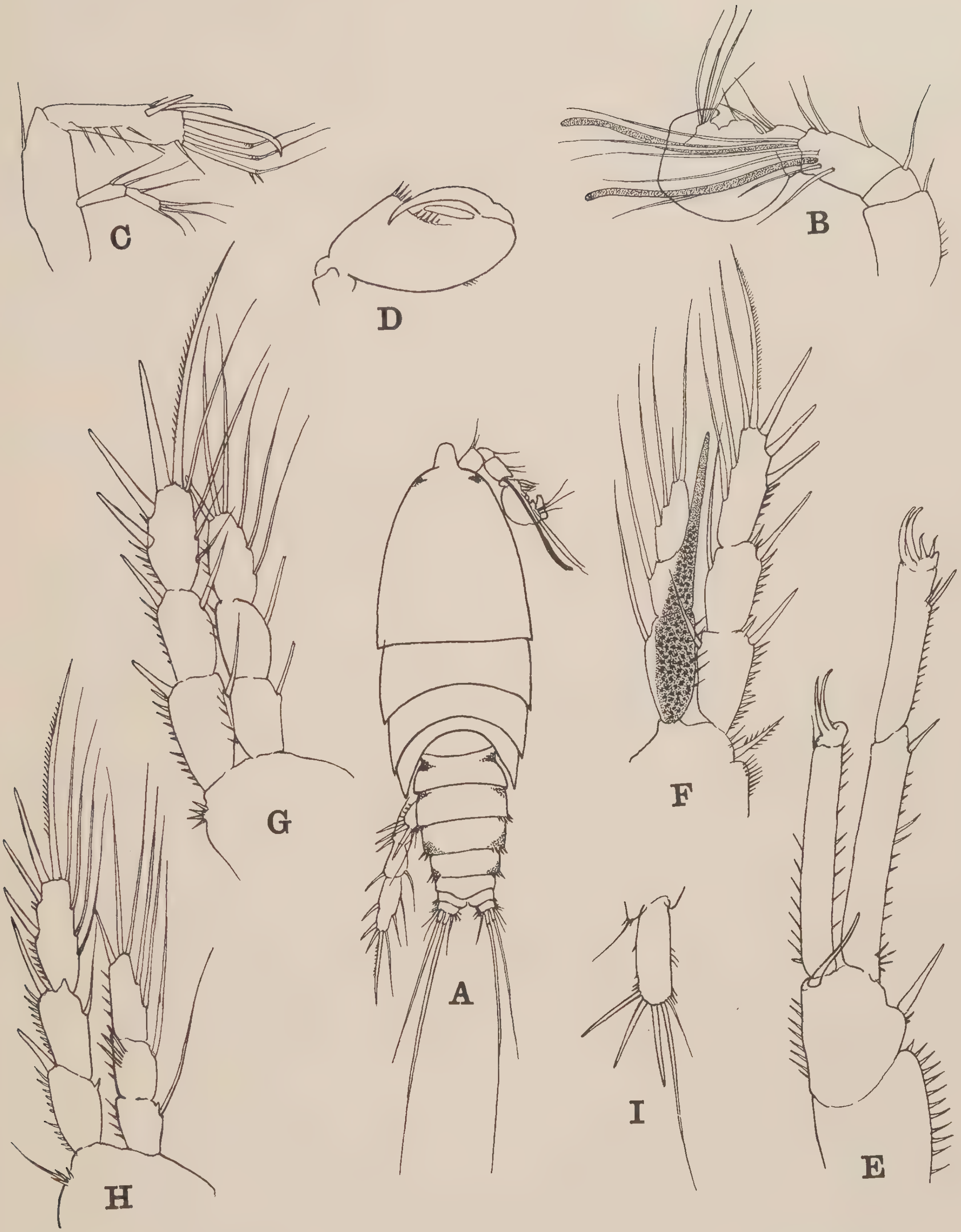
The 1st antenna (Text-fig. 9, B) consists of the usual nine segments, of which the first four form the basal portion and the distal five the apical. The proportional lengths of these antennal segments are as follows:

Segment	1.	2.	3.	4.	5.	6.	7.	8.	9.
	20	16	20	18	7	7	4	3	5 = 100

The proximal basal portion is thus to the distal portion in the proportion of 73 : 27.



Text-fig. 9.—*Harpacticus clausi* A. Scott, ♀. A, Female, dorsal view. B, 1st antenna. C, 2nd antenna. D, Maxilliped. E, 1st leg. F, 2nd leg. G, 3rd leg. H, 5th leg.



TEXT-FIG. 10.—*Harpacticus clausi* A. Scott. A, Male, dorsal view. B, 1st antenna. C, 2nd antenna. D, Maxilliped. E, 1st leg. F, 2nd leg. G, 3rd leg. H, 4th leg. I, 5th leg.

There is but little difference, if indeed any, in the mouth-parts and swimming-feet of this form and of *Harpacticus gracilis*, var. *orientalis*, but the 5th leg (Text-fig. 9, H) is clearly different. In the present form the distal segment, although armed with setæ that in their arrangement and proportional lengths closely resemble those of *H. gracilis*, var. *orientalis*, is very considerably longer and the sides are parallel instead of being curved; the proportion of length to breadth is 3 : 1.

There is a difference between the armature of the inner expansion of the proximal segment of the 5th leg in the present examples and the description given by A. Scott. Scott (*loc. cit.*, p. 201) describes this as being "broadly rounded. It is furnished with two sub-apical spines and one outer marginal spine. There is a considerable space between the inner marginal spine and the inner sub-apical spine. The surface of the expansion is furnished with two small setæ near the distal end of the inner margin". Gurney (1927*c*, p. 494) has, however, pointed out that "Scott's figure rather leads one to suppose that his single specimen was abnormal", and with this I entirely agree.

♂. Total length, 0·6 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 10, A) are as 64 to 36.

The proportional lengths of the various segments of the posterior region are as follows:

Segment Th. 5.	Abd. 1.	2.	3.	4.	5.	Furca.	
24	21	21	16	8	5	5	= 100

As in the female, there is but little difference in the appendages from those of *Harpacticus gracilis*, var. *orientalis*, but the 5th leg (Text-fig. 10, I) is, as in the female, decidedly longer and narrower than in that form.

Gurney has put forward the suggestion that this form is merely a variety of *H. gracilis*, but the difference in the 5th leg of both sexes is so marked that I think it advisable, at any rate for the present, to regard them as separate species.

Harpacticus fucicolus T. Scott. (Text-fig. 11, A–H.)

Harpacticus fucicolus, T. Scott, 1912, p. 543, pl. viii, figs. 20–24.

Occurrence.—In Nankauri Harbour, Nicobar Islands, in weed-washings; a single female.

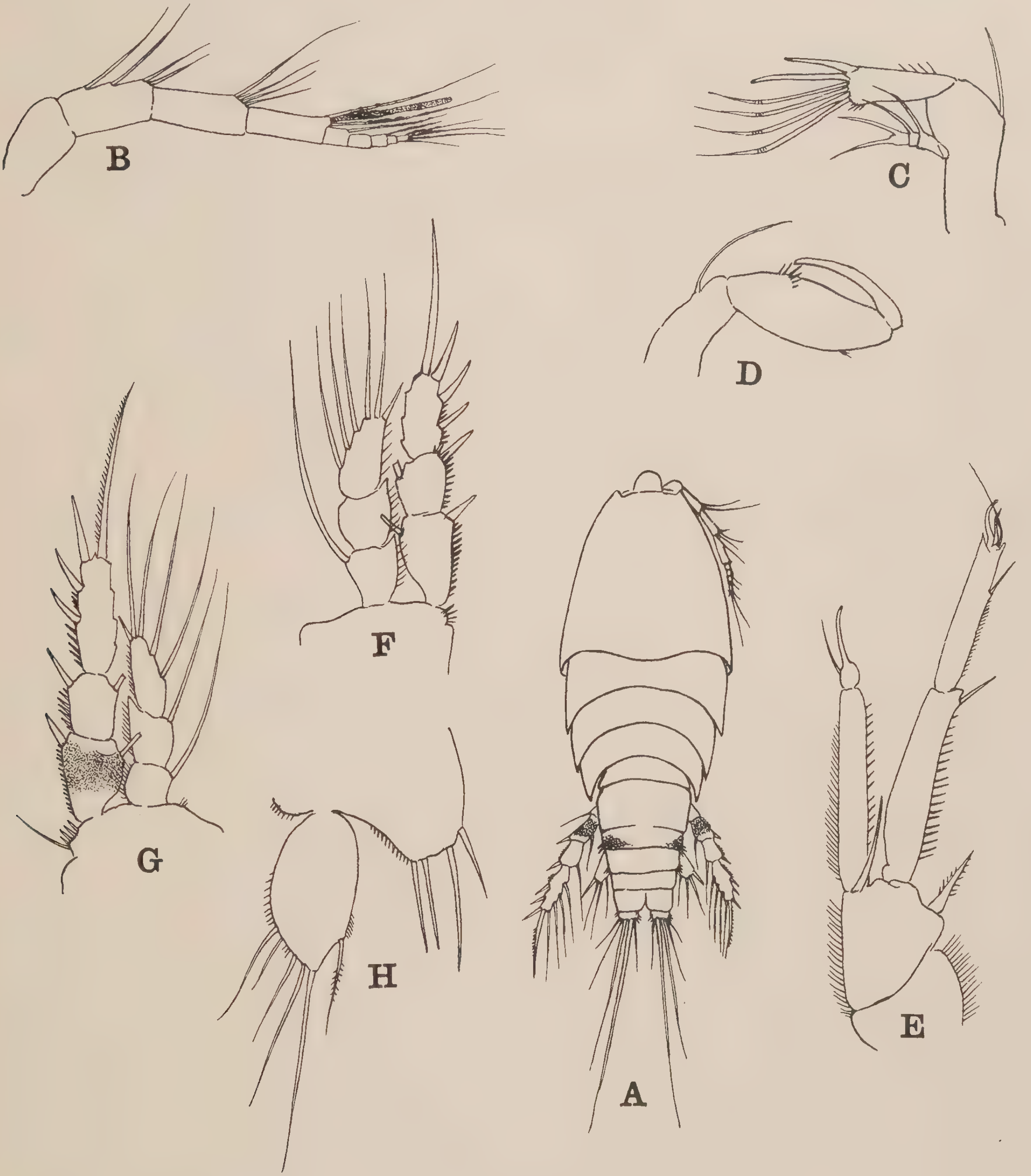
Descriptive Notes.—This species was described from examples taken by the "Scotia" in floating weed in the North Atlantic Ocean between Cape Verde and the Azores.

♀. Total length, 0·466 mm. Scott does not mention the size of his specimens.

The anterior region of the body (Text-fig. 11, A) is moderately robust, its greatest width being at the level of the 2nd thoracic segment; the posterior region tapers gradually to the furca. The proportional lengths of the two regions are as 63 : 37. The lengths of the various segments of the posterior region of the body are as follows:

Segment Th. 5.	Abd. 1-2.	3.	4.	5.	Furca.	
16	44	15	11	11	3	= 100

The postero-lateral region of the genital segment of the abdomen is tinged a red-brown colour, and a band of similar colour runs across the middle of the 1st segment of the exopod of the 4th leg. The postero-lateral margins of the genital and the next following segment of the abdomen bear fine spines. The furcal rami are about twice as broad as long.



Text-fig. 11.—*Harpacticus fucicolus* T. Scott. A, Female, dorsal view. B, 1st antenna. C, 2nd antenna. D, Maxilliped. E, 1st leg. F, 3rd leg. G, 4th leg. H, 5th leg.

The 1st antenna (Text-fig. 11, B) reaches back for about two-thirds of the cephalic segment and is composed of nine segments that have the following proportional lengths:

Segment 1.	2.	3.	4.	5.	6.	7.	8.	9.
20	20	23	18	5	5	4	2	3 = 100

The basal part of the appendage, consisting of four segments, is four-and-a-quarter times as long as the distal part.

The 2nd antenna (Text-fig. 11, C) is less strongly developed than in *H. gracilis*; T. Scott states that the outer ramus is short and is composed of two joints, but in the present examples this ramus possessed three segments, the middle one being very small.

The maxilliped (Text-fig. 11, D) is more delicate than in *H. gracilis*, the hand being less powerful.

The swimming-legs (Figs. 11, E, F and G) closely resemble those of *H. gracilis*, but the 5th leg (Text-fig. 11, H) is somewhat different. The inner portion of the basal segment is rather wider than in *H. gracilis*, and though it is armed with four spine-like setæ, the proportional lengths of these are different; taking these in order from without inwards, the first two are about equal in length, the 3rd is the longest and the 4th is about three-fourths as long as the first two, whereas in *H. gracilis* the 2nd is the longest and the 4th is considerably smaller than the others. In the distal segment one seta springs from the inner margin, a long seta arises from the extreme apex, and in my examples four setae arise from the outer border, two from close together near the distal end, and then after a short two very unequal setæ from about the junction of the middle and distal thirds. Scott does not figure the short 5th seta. No corresponding males were seen.

DISTRIBUTION.—Up to the present time this species has only been recorded from the Nicobar Islands (present record) and the North Atlantic Ocean (T. Scott).

Family TISBIDÆ (= IDYIDÆ).

A considerable degree of confusion in the nomenclature has arisen in this family. According to Sars (1903–11), the family includes the genera *Aspidiscus* Norman, *Psamathe* Philippi, *Machairopus* Brady, *Idya* Philippi, *Idyanthe* Sars and *Idyella* Sars. To these must be added *Tisbella* Gurney, *Bathyidia* Farran and *Chappaquiddicka* Wilson. As Stebbing (1910, p. 544) and Wilson (1932, p. 195) have pointed out, the name *Idya*, proposed by Philippi in 1843 for his genus, is preoccupied, and therefore Lilljeborg's name, *Tisbe*, proposed in 1853, is valid, thus rendering Sars' new name *Idyæa*, proposed in 1903–11, p. 367, unnecessary. Again, as Brian (1928, p. 311) and Wilson (1924, p. 16) have pointed out, the name *Psamathe*, adopted by Philippi in 1840, is invalid as it is already preoccupied, and therefore the name *Scutellidium*, proposed by Claus in 1866, becomes valid for this genus. The name *Idyanthe* Sars was proposed for the original name *Idyopsis* Sars (*vide* Sars, 1903–11, pp. 97 and 369) as this latter was preoccupied. A study of the accounts given by Gurney (1927*c*, p. 500) of his new genus *Tisbella* and that of Wilson (1932, p. 198) for his genus *Chappaquiddicka* fails to reveal any difference that would justify the separation of these forms, and thus *Chappaquiddicka* becomes a synonym of *Tisbella*.

The correct nomenclature of the various genera in the Family would thus appear to be as follows:

Aspidiscus Norman.
Bathyidia Farran.
Idyanthe Sars (=*Idyopsis* Sars).
Idyella Sars.
Machairopus Brady.

Pseudoidya Brady.
Scutellidium Claus (=*Psamathe* Philippi).
Tisbe Lilljeborg (=*Idya* Philippi, *Idyœa* Sars).
Tisbella Gurney (= *Chappaquiddicka* Wilson).

To these I propose adding two new genera, *Tisbintra* and *Paraidya*, to accommodate new forms from Indian waters.

Genus *Tisbe* Lilljeborg (= *Idya* Philippi, *Idyœa* Sars).

This genus is represented in Indian waters by six species, namely,

Tisbe ensifera var. *indica* Sewell.
T. furcata (Baird).
T. gracilis (T. Scott).
T. longicornis (T. and A. Scott).
T. longisetosa Gurney.
T. tenera Sars.

Tisbe furcata (Baird).

Idya furcata, Brady, 1880, p. 172, pl. lxvii, figs. 1–11; Sars, 1903–11, p. 88, pls. li and lii, 1; Monard, 1928*a*, p. 328, fig. xiii, 1.

Occurrence.—Nankauri Harbour, Nicobar Islands, in weed-washings. Addu Atoll, Maldive Archipelago, in weed-washings.

Descriptive Notes.—♀. Total length, 0·6 mm.

The anterior and posterior regions of the body have the proportional lengths of 69 to 31. The segments of the posterior region are in the proportions as follows:

Segment	Th. 1.	Abd. 1–2.	3.	4.	5.	Furca.
	13	41	15	15	6	10 = 100

The 1st antenna reaches back to about the posterior margin of the cephalosome; it consists of eight segments having the following proportional lengths:

Segment	1.	2.	3.	4.	5.	6.	7.	8.
	17	24	24	13	5	5	4	8 = 100
(Brady) .	15	28	20	12	5	5	3	12 = 100

There would thus seem to be some degree of variation in the lengths of the segments and especially in the terminal segment, which in the Nicobar specimens is only twice the length of the 7th, whereas in Brady's examples it was no less than four times the length.

Distribution.—In all three great oceans from New Zealand in the Pacific to the Arctic Seas; it has been recorded from the Alaskan coast (Willey), New Zealand (Thomson, Brady), Chatham Island in the Pacific (Sars), Ceylon Pearl Banks (Thompson and A. Scott), the Chilka Lake (Sewell), the Red Sea (A. Scott), the North Atlantic Ocean off Madeira (Fischer), the Mediterranean Sea (Car, Pesta, Brian, Monard), the east coast of North America (Wilson, Williams, Sharpe), the French coast (Canu), the British Isles (Brady), the North Sea (Timm, Klie), Kiel Bay (Giesbrecht), the Baltic Sea (Klie), E. Greenland (Jespersen), the Norwegian coast (Sars), off Franz-Josef Land (T. Scott) and Nova Zembla (Brady).

Tisbe gracilis (T. Scott).

Idya gracilis, Sars, 1903–11, p. 94, pl. lv, fig. 1.

Occurrence.—Nankauri Harbour, Nicobar Islands, in tow-netting from 12 fathoms, very near bottom ; 2 examples.

Distribution.—The Nicobar Islands (present record), the Mediterranean Sea (Monard), the North Atlantic Ocean, Bermuda (Willey), the Brittany coast, Roscoff (Monard), the Scottish coast (T. Scott), E. Greenland (Jespersen), the coast of Norway (Sars) and Grinnel Land (Monard).

Tisbe ensifera var. *indica* (Sewell).

Idyœa ensifera, Sars, 1903–11, pp. 90, 367, pl. liii, fig. 1.
Idyœa ensifera var. *indica*, Sewell, 1924, p. 817, pl. lii, fig. 1.

Occurrence.—Nankauri Harbour, Nicobar Islands, in tow-netting, 12 fathoms, near the bottom.

Distribution.—*Tisbe ensifera* has been recorded from the North Atlantic Ocean, Madeira (Fischer), and Bermuda (Willey), the Mediterranean Sea (Brian), the Norwegian coast (Sars) and Grinnel Land (the Fram Expeditions). This variety, *indica*, has now been taken in the Nicobar Islands and the Chilka Lake (Sewell).

Tisbe tenera (Sars).

Idya tenera, Sars, 1903–11, p. 91, pl. liii, fig. 2 ; Gurney, 1927*c*, p. 497, fig. 129.

Occurrence.—Nankauri Harbour, Nicobar Islands, in weed-washings.

Remarks.—The form recorded by Brady (1910, p. 360, pl. liv, fig. 2, text-fig. xlvii,1–9) from Kerguelen and Simon's Bay, Cape of Good Hope, under the name *Tisbe tenuimana* Giesbrecht, is certainly not that species, and much more nearly resembles *Tisbe tenera* (Sars).

Distribution.—Up to the present time this species has only been recorded from the coast of Norway (Sars), the English Channel, Roscoff (Monard), and the Suez Canal (Gurney). Its occurrence in Nankauri Harbour, Nicobars, increases its range very considerably.

? *Tisbe longisetosa* Gurney.

Tisbe longisetosa, Gurney, 1927*c*, p. 497, fig. 130.

Occurrence.—Addu Atoll, Maldive Archipelago, in weed-washings ; a single female.

Descriptive Notes.—♀. Total length, 0·6 mm.

The proportional lengths of the thoracic and abdominal regions of the body were as 66 to 33. The proportional lengths of the segments of the posterior region are as follows :

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
11	26	22	17	14	10 = 100

The 1st antenna is long and reaches back as far as the 3rd abdominal segment ; it consists of eight segments that have the following proportional lengths :

Segment 1.	2.	3.	4.	5.	6.	7.	8.
10	23	29	20	5	4	3	6 = 100

The 2nd antenna is very long and slender and appears to consist of four segments, the normal 3rd segment presenting an appearance of subdivision into two, a long proximal and a short oval distal part; from the distal end of the proximal part two slender setæ arise, and the distal part bears a row of hairs on its margin and five setæ distally. The exopod is very short and is composed of two segments, of which the proximal bears a spine and a delicate seta on its margin and the distal segment bears one seta on its margin and three distally.

The maxilliped is long and slender, as in *Tisbella timsæ* Gurney; the 2nd joint is very long and slender, and the 3rd joint is short and bears two setæ; the claw is long, and bears a spine about half-way along its inner margin.

The legs agreed with Gurney's description.

DISTRIBUTION.—If I am correct in regarding this specimen as an example of *Tisbe longisetosa* Gurney, then this species has now been taken in the Maldive Archipelago and the Suez Canal (Gurney).

Genus *Tisbintra* nov.

DESCRIPTION OF THE GENUS.—The general body-form resembles that of *Tisbe*. The cephalosome is produced forwards in a rounded rostral projection. The epimeral plates of the 2nd and 3rd thoracic segments are produced laterally and posteriorly, and are rounded at the tip; that of the 4th segment is rounded. The urosome is slender. The genital segment is long with a trace of division laterally; a long delicate spine is situated at the lateral end of the genital aperture on each side. The furcal rami are short and the 2nd seta is elongate, being approximately as long as the whole abdomen. The 1st antenna consists of 8 segments. In the 2nd antenna the exopod consists of 2 segments only, as in *Idyella*; the endopod is composed of three segments. The mandible (Text-fig. 12, E) possesses a slender biting ramus, provided with several teeth distally and with a truncate projection on its posterior margin, as in *Tisbe*. The 1st maxilla (Text-fig. 12, F) is as in *Tisbe*. The maxilliped (Text-fig. 12, G) possesses a long terminal claw as in *Tisbella*. In the 1st leg the exopod consists of three segments, diminishing in size distally; the endopod possesses two segments only and is considerably longer than the exopod; endopod 1 bears a single inner seta, and endopod 2 has a single straight spine at the distal end. Legs 2–4 possess rami of approximately equal length; both rami are composed of three segments. The setal formula of the swimming-legs is as in *Tisbe* and *Tisbella*. In the 5th leg the basal segment is not produced, and the distal segment is elongate and bears four setæ.

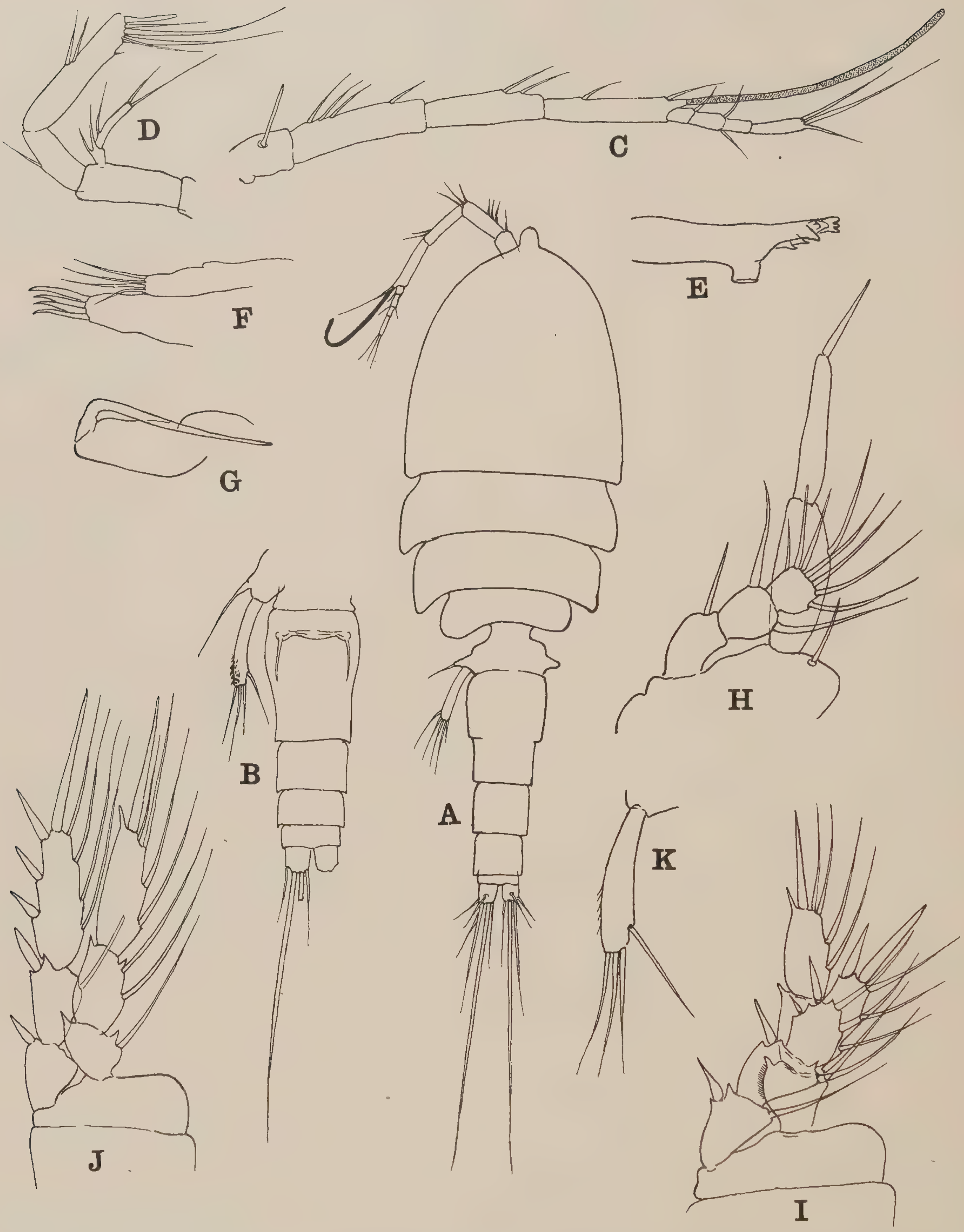
Tisbintra nankaurica sp. nov. (Text-fig. 12, A–K.)

OCCURRENCE.—Nankauri Harbour, Nicobar Islands, in tow-netting at the surface; a single female.

DESCRIPTIVE NOTES.—♀. Total length, 1·23 mm. The proportional lengths of the anterior and posterior regions of the body are as 62 to 38. The proportional lengths of the segments of the posterior region are as follows:

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
22	38	14	13	4	9 = 100

The genital segment is thus approximately equal in length to the remainder of the abdomen.



Text-fig. 12.—*Tisbintra nankaurica* gen. nov., sp. nov. a, Female, dorsal view. b, Abdomen, ventral view. c, 1st antenna. d, 2nd antenna. e, Mandible. f, 1st maxilla. g, Maxilliped. h, 1st leg. i, 2nd leg. j, 4th leg. k, 5th leg.

The genital segment shows traces of division laterally, and the genital aperture is guarded by a long slender spine on each side (Text-fig. 12, B).

The 1st antenna (Text-fig. 12, C) reaches back as far as the posterior margin of the cephalosome and consists of 8 segments, that have the following proportional lengths :

Segment	1.	2.	3.	4.	5.	6.	7.	8.
	12	25	21	22	3	5	4	8 = 100

In the 2nd antenna (Text-fig. 12, D) the endopod consists of three segments, of which the terminal is nearly twice as long as the preceding. The distal segment bears two setæ on the anterior margin a little beyond the middle of its length, and one spine and four setæ distally. The exopod is composed of two segments only, as in *Idyella* ; of these the proximal bears two setæ and the distal one basally and two distally.

In the 1st leg (Text-fig. 12, H) the exopod is stoutly built and consists of the usual three segments, but the marginal spine on the 1st segment is of moderate length, whereas that on the 2nd segment is considerably longer. Exopod 2 is of about the same length as exopod 1 and bears a single inner seta ; exopod 3 is quadrate in form, and bears three delicate seta-like spines on the outer margin and four setæ on the distal and inner margins. The endopod is considerably longer than the exopod and consists of only two segments, of approximately equal length ; the proximal segment is moderately stout, and bears a single inner seta at about the junction of the middle and distal thirds ; the distal segment is slender and bears a single straight spine distally.

In the swimming-legs the setal formula is as follows :

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P2	1	2	2, 2, 1	1	1	2, 2, 3
P3	1	2	3, 2, 1	1	1	3, 2, 3
P4	1	2	2, 2, 1	1	1	3, 2, 3

In the 2nd leg (Text-fig. 12, I) the proximal spine on the 3rd segment of the exopod is markedly reduced in size.

In the 5th leg (Text-fig. 12, K) the basal segment is produced externally in a conical process that bears a single seta, but I was unable to detect any inner projection or setæ ; the distal segment is cylindrical in form and is about five times as long as broad ; it bears a single seta on its outer margin near the distal end and three setæ distally.

Genus *Paraidya* nov.

I propose the erection of this new genus to accommodate two closely allied species, which, while exhibiting considerable resemblances to the genera *Tisbe*, *Tisbella* and *Bathyidia*, possess certain characteristic features.

Description of the Genus.—The body is cylindrical in form and there is but little difference between the anterior and posterior regions, whereas in the genera *Tisbe*, *Tisbella*, *Idyanthe* and *Idyella* the two regions are sharply defined from each other, the anterior region being expanded. The caudal rami are of moderate length and the 2nd furcal seta is much elongated.

The 1st antenna in the female, as in the genus *Tisbella*, consists of only seven segments, the proximal stouter portion comprising four segments, while the slender distal portion is composed of three only; in the male it consists of ten segments and forms a grasping organ. The 2nd antenna resembles that of *Tisbe*. The mandibular palp (Text-fig. 13, E) somewhat resembles that of Wilson's species *Chappaquiddicka pulchella* in that both rami are composed of a single segment and the outer arises from the extreme distal end of the basal segment; about half-way along the outer ramus a group of setæ arises, suggesting that this branch has been formed by the fusion of two originally separate segments, as in the genus *Tisbella*. The 2nd maxilla (Text-fig. 13, F) resembles that of *Tisbe finmarchica* (Sars) and *Chappaquiddicka pulchella* Wilson, in that there is no trace of the lateral lobe on the basal segment and the distal claw is extremely long, and bears near the middle of its length a stout spine that is fringed with hairs. The maxilliped (Text-fig. 13, G) resembles that of *Tisbe*. In the 1st leg both rami are composed of three segments, but the endopod is not markedly elongated, as in the genus *Tisbe*; this appendage presents a close similarity to that of *Bathyidia* Farran and differs from that of *Chappaquiddicka* and *Tisbella*, in which the endopod consists of only two segments; the 3rd joint of the endopod carries two long setæ and one spine at the outer distal angle, thus differing from *Bathyidia*, in which there are three long setæ. The 3rd and 4th legs are similar to those of *Tisbe*; the setal formula is as follows:

Segments.	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P2	1	2	2, 2, 1	1	1	2, 2, 3
P3	1	2	3, 2, 1	1	1	3, 2, 3
P4	1	2	2, 2, 1	1	1	3, 2, 3

In the 5th leg the proximal portion exhibits no inner seta-bearing expansion, and the distal segment is somewhat elongate, but bears only four setæ distally.

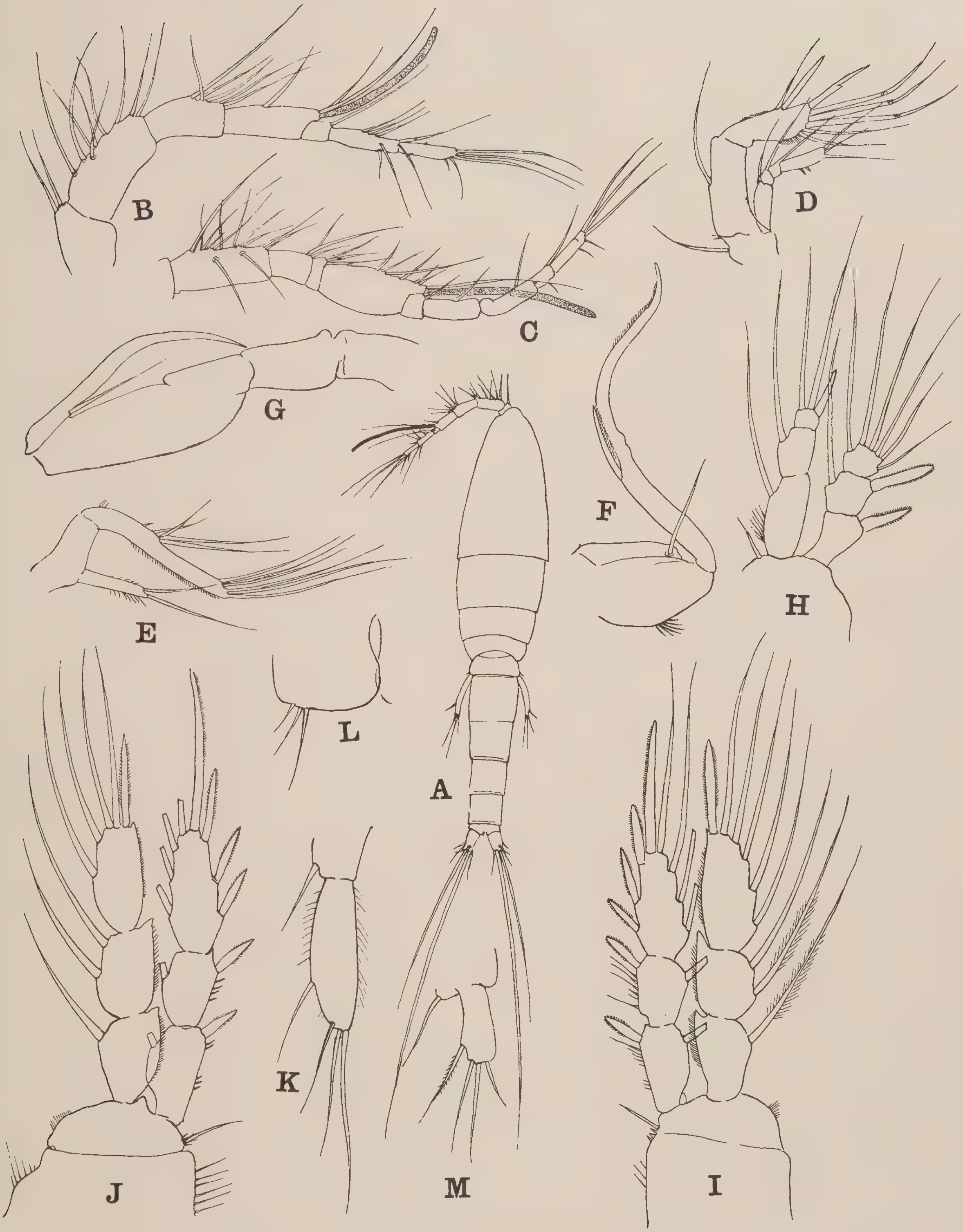
In the male the 1st antenna consists of ten segments and the hinge-joint falls between segments 7 and 8, so that the distal portion is composed of three segments, instead of only two as in the genus *Tisbe*. The genital armature consists of a broad lamellar flap that bears three delicate setæ; there is no strong spine such as one gets in *Tisbe furcata* (Baird), *T. gracilis* (T. Scott), *T. gurneyi* Lang and *T. armatus* Brady, *Scutellidium longicaudum* (Philippi), *S. machairopoides* (Monard), *S. plumosum* Brady and *Machairopus digitatus* Brady.

Paraidya major nov. (Text-fig. 13, A–M.)

OCCURRENCE.—Nankauri Harbour, Nicobar Islands, in weed-washings; several examples of both sexes.

DESCRIPTIVE NOTES.—♀. Total length, 1·07 mm.

The anterior and posterior regions of the body are in the proportion of 54 to 46. The body (Text-fig. 13, A) is somewhat compressed laterally, not dorso-ventrally as in the genera *Tisbe*, *Tisbella*, *Bathyidia*, etc. The forehead is rounded, and the rostrum is depressed and invisible from the dorsal aspect; it is broadly rounded and appears to be fused with the cephalon. The cephalic segment is fused with the 1st thoracic segment, and the



TEXT-FIG. 13.—*Paraidya major* sp. nov. A, Female, dorsal view. B, 1st antenna, female. C, 1st antenna, male. D, 2nd antenna, female. E, Mandibular palp, female. F, 2nd maxilla. G, Maxilliped. H, 1st leg, female. I, 3rd leg, female. J, 4th leg, female. K, 5th leg, female. L, Genital armature, male. M, 5th leg, male.

combined mass is more than half the length of the anterior region of the body, the proportional lengths being as follows :

Cephalon and thoracic segment 1 (fused)	60
The 2nd, 3rd and 4th thoracic segments	40

The genital segment is long, and the line of fusion of segments 1 and 2 is clearly visible running across the dorsal aspect. The proportional lengths of the segments of the posterior region are as follows :

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
11	37	19	14	3	16 = 100

The furcal rami are twice as long as broad, and each bears five setæ and a dorsal accessory seta ; seta 2 is very long, being about two-thirds the length of the whole body.

The 1st antenna (Text-fig. 13, B) reaches back beyond half the length of the cephalosome ; it consists of a moderately stout basal portion of four segments and a more slender distal portion composed of only three segments, of which the proximal is short. The proportional lengths of the segments are as follows :

Segment 1.	2.	3.	4.	5.	6.	7.
13	21	16	17	6	16	11 = 100

The 2nd antenna (Text-fig. 13, D) consists of a basal segment, a two-jointed endopod and a well-developed exopod of four segments.

The characters of the mouth-parts have been given under that description of the genus.

In the 1st leg (Text-fig. 13, H) the two basal segments appear to be fused. Both rami are composed of three segments, and the endopod is comparatively stout and but little longer than the exopod ; the 1st and 2nd segments of the exopod each bear a stout serrated marginal spine, but the 1st segment has no inner seta ; the marginal spines of the 3rd segment are long, slender and setiform in character, so that the segment appears to carry six setæ, as in *Bathyidia remota* Farran (1926, pl. 10, fig. 16). Endopod 1 is slightly longer than the two following segments together ; it bears a single inner seta ; endopod 3 bears a stout spine at its distal outer angle and two setæ arise from the distal margin ; it thus differs from *Bathyidia remota* Farran, in which the spine is situated between the two setæ.

The 2nd–4th legs (Text-figs. 13, I, J) resemble those of *Tisbe.*

The 5th leg (Text-fig. 13, K) is composed of the usual two segments, a basal and a distal. The basal segment carries a single seta on its outer margin, but there is no inner expansion of the segment and no seta arises from the inner margin. The distal segment is moderately elongate-oval in shape, being about four times as long as broad ; it bears a single seta on its outer margin and three at the distal end ; both margins are fringed with hair.

♂. The body has the same general shape as in the female. The proportional lengths of the segments of the posterior region are as follows :

Segment Th. 5.	Abd. 1.	2.	3.	4.	5.	Furca.
10	20	20	16	15	8	11 = 100

The furcal rami are not so long as in the female, and the length is to their breadth as 64 to 36.

In the 1st antenna (Text-fig. 13, c) the proportional lengths of the segments are as follows :

Segment	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
	13	22	9	3	17	4	10	11	3	8 = 100

The very short 4th segment appears to be derived by a segmentation of the original segment 3 into two parts ; the 5th segment is somewhat swollen and bears a sensory seta at its distal end. The hinge-joint is formed between segments 7 and 8, so that the distal portion is composed of only three segments.

The 5th leg (Text-fig. 13, M) in its general form resembles that of the female, but the distal segment is shorter and the terminal part is truncated so that all the three distal setæ arise at the same level ; one seta springs from the outer margin.

Distribution.—The Nicobar Islands.

Paraidya minor sp. nov. (Text-fig. 14, A–L.)

Occurrence.—Nankauri Harbour, Nicobar Islands, in weed-washings ; several examples of both sexes.

Descriptive Notes.—♀. Total length, 0·70 mm.

In its general shape and appearance this species very closely resembles *Paraidya major*. The body is laterally compressed, and the proportional lengths of the anterior and posterior regions are as 59 to 41. The rostrum is large and depressed, and the rounded anterior margin is fringed with short processes forming a crest that is interrupted in the middle line ; it is fused with the cephalon.

The 1st antenna (Text-fig. 14, c) is composed of seven segments that have the following proportional lengths :

Segment	1.	2.	3.	4.	5.	6.	7.
	15	25	18	16	4	11	11 = 100

The 2nd antenna (Text-fig. 14, D) is of the same type as in *Paraidya major*, but the exopod, although consisting of the same four segments, is considerably smaller and shorter in proportion to the endopod.

The mouth-parts (Text-figs. 14, E–H) resemble those of *P. major* and have the form characteristic of the genus.

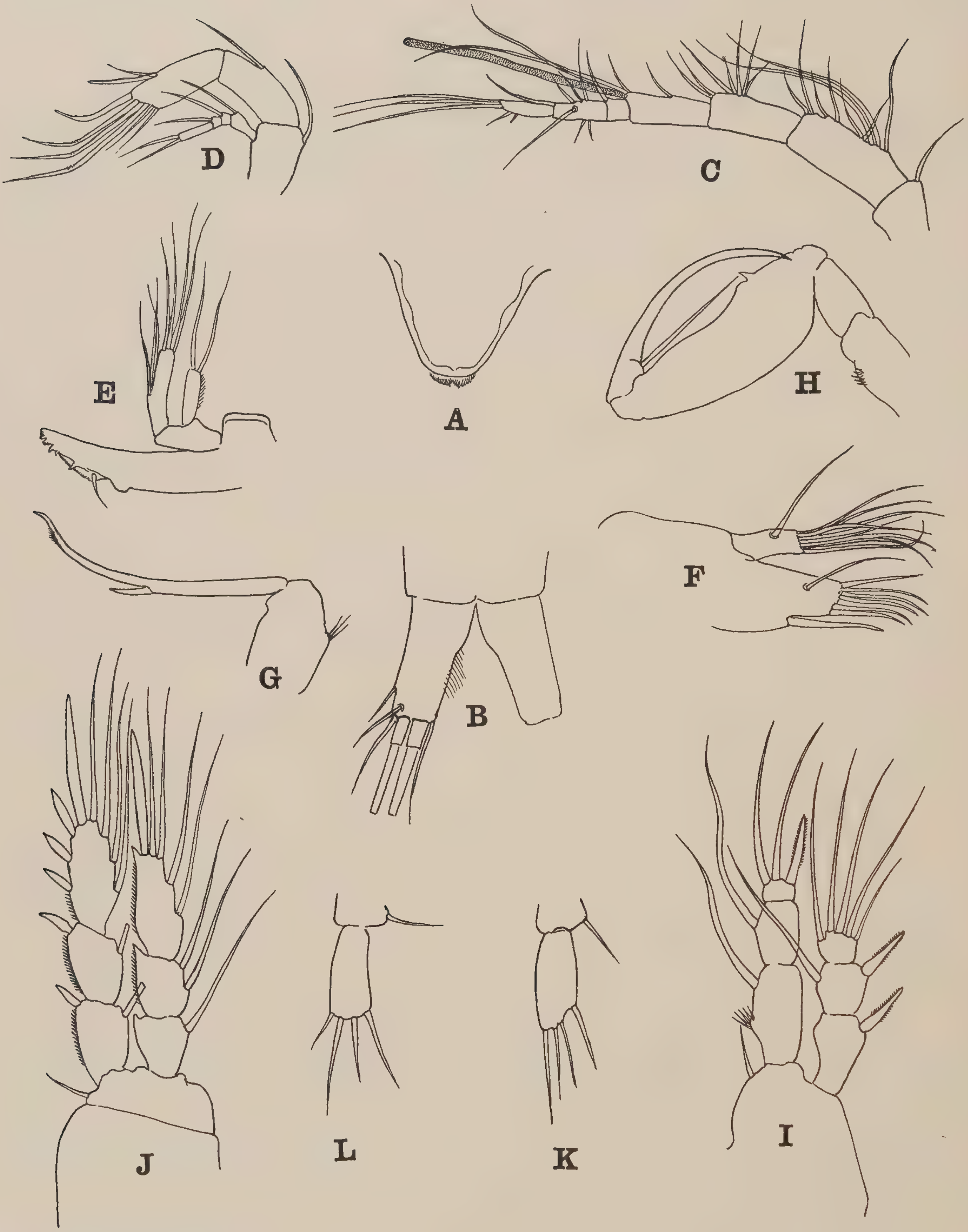
In the 1st leg (Text-fig. 14, I) the two basal segments appear to be fused. The two rami closely resemble those of *P. major* but the endopod is slightly longer in proportion to the exopod, this latter reaching only as far as the middle of the 2nd segment of the endopod instead of to the joint between the 2nd and 3rd segments. In the exopod the marginal spine on the 2nd segment is not so strongly developed as in *P. major*, and I could only detect five setæ on the terminal segment instead of six.

The 2nd–4th legs closely resemble those of *P. major*.

In the 5th leg (Text-fig. 14, K) the free segment is much shorter than in *P. major*.

♂. The 1st antenna closely resembles that of *P. major* and the segments have the following proportional lengths :

Segment	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
	13	25	8	2	19	4	9	10	4	6 = 100



TEXT-FIG. 14.—*Paraidya minor* sp. nov. A, Rostrum. B, Furcal rami, female. C, 1st antenna, female. D, 2nd antenna. E, Mandible. F, 1st maxilla. G, 2nd maxilla. H, Maxilliped. I, 1st leg. J, 4th leg. K, 5th leg, female. L, 5th leg, male.

The appendages all closely resemble those of *P. major* and present only slight differences of detail.

I have previously (*vide supra*, p. 121) called attention to several species in which two forms are known to exist, differing but little from each other except in size and small details of structure ; it is possible that the above two forms may be stages in the life-history of one species rather than two distinct species, but the fact that they were taken together seems to contra-indicate any suggestion that they can be different races of the same species.

DISTRIBUTION.—The Nicobar Islands.

Genus *Scutellidium* Claus (= *Psamathe* Philippi).

Scutellidium longicaudum (Philippi).

Psamathe longicauda, Sars, 1903–11, p. 83, pl. xlix ; Monard, 1928*a*, p. 330, fig. xiii, 4.
? *Psamathe sargassi*, Sars, 1916.

OCCURRENCE.—Addu Atoll, Maldive Archipelago, in weed-washings ; several specimens.

DESCRIPTIVE NOTES.—♀. Total length, 0·71 mm. This is somewhat smaller than usual; Monard's specimens from the Mediterranean measured 1·0 mm., and Sars' examples from Norway 0·88 mm. The anterior and posterior regions of the body are in the proportions of 63 to 37.

The segments of the posterior region have the following proportional lengths :

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
14	40	19	14	6	7 = 100

In one example the genital segment carried a single egg-sac containing about 24 ova.

The 1st antenna is composed of nine segments that have the following proportional lengths :

Segment 1.	2.	3.	4.	5.	6.	7.	8.	9.
15	30	17	6	3	3	4	8	14 = 100

DISTRIBUTION.—From New Zealand (Thomson), the Maldive Archipelago, the Mediterranean Sea (Philippi, Claus, Brian, Monard), the Black Sea (Karawaiew), the North Atlantic, Madeira, Ireland (Farran), the Brittany Coast, Roscoff (Monard), the British Isles (Brady), the coast of Norway (Sars), and Franz-Josef Land (T. Scott).

Scutellidium machairopoides (Monard). (Text-figs. 15, A–H, ♀ ; 16, A–J, ♂.)

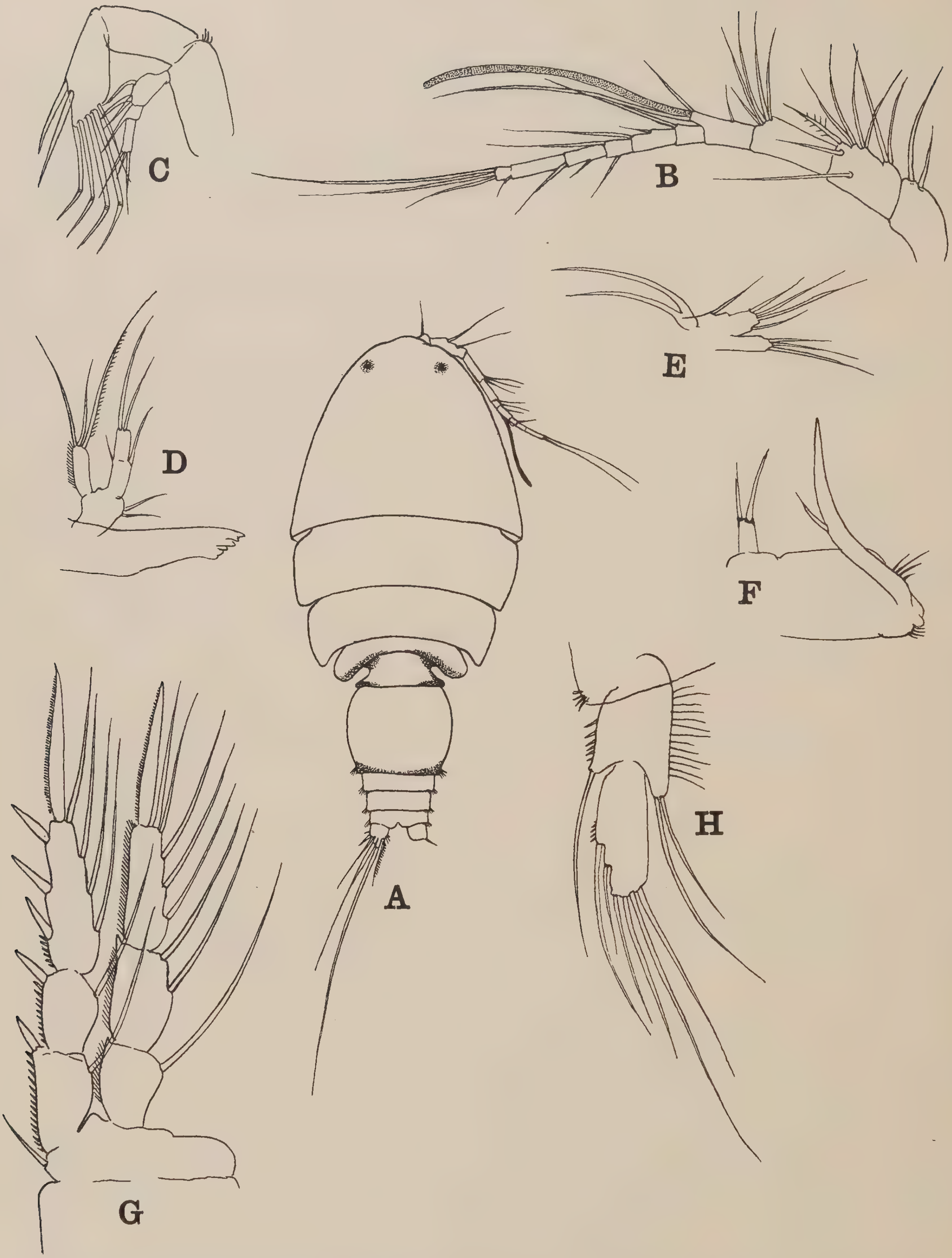
Psamathe machairopoides, Monard, 1928, p. 331, figs. xiii, 5, and xiv, 1.

OCCURRENCE.—Nankauri Harbour, Nicobar Islands, in weed-washings.

DESCRIPTIVE NOTES.—♀. Total length, 0·70 mm. The proportional lengths of the anterior and posterior regions of the body are as 58 to 42. The segments of the posterior region have the following proportional lengths :

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
12	51	13	9	6	9 = 100

The anterior border of the cephalon (Text-fig. 15, A) is rounded ; on either side, behind and a little to the outer side of the attachment of the 1st antenna, is a well-marked spot of purple pigment. In this respect it seems probable that this species closely resembles



Text-fig. 15.—*Scutellidium machairopoides* (Monard). ♀. A, Female, dorsal view. B, 1st antenna. C, 2nd antenna. D, Mandible. E, Maxillary palp. F, 2nd maxilla. G, 3rd leg. H, 5th leg.

the form described by Brady from Kerguelen under the name *Machairopus idyoides*, and in which, he states, a pair of widely distant eyes are present on the cephalon. The posterior margins of segments 2 to 4 and the lateral parts of segment 5 are armed ventrally with minute spines ; Monard noted their presence on segments 2–4.

The 1st antenna (Text-fig. 15, B) consists of nine segments, that have the following proportional lengths :

	Segment 1.	2.	3.	4.	5.	6.	7.	8.	9.	
	17	17	17	10	5	10	5	8	11	= 100
(Monard)	20	20	19	8	5	7	5	5	10	= 99

For comparison I have recalculated the measurements of the segments given by Monard as parts per 100 and have included these in the table above ; such slight differences as appear may well be due to variations in the length of the segments, or to the difficulty of measuring such small objects with complete accuracy.

The 2nd antenna (Text-fig. 15, C) bears on the distal segment of the endopod two spines and four geniculate setæ ; the former seem to be more delicate in the present examples than in those examined and figured by Monard (*loc. cit.*, fig. xiv, 1). In the specimen examined the exopod consisted of only three segments, instead of four, thus resembling *Machairopus idyoides* Brady (1883, pl. xli, fig. 4) ; the proximal segment is stouter than the others and bears three setæ, the 2nd segment bears a single seta and the distal three, so that the total number of setæ is the same as in Monard's type ; the proximal segment would thus appear to have been formed by the failure of the 1st and 2nd segments to separate, and this is borne out by the fact that in the male the exopod consists of the normal four segments. The mandible (Text-fig. 15, D) has the form that is present in the genus *Machairopus* (*vide* Brady, 1883, pl. xli, fig. 5, and Sars, 1903–11, pl. l) ; it consists of a basal segment and two rami, each of a single segment, and the endopod springs from the anterior margin and not the terminal end of the basal segment, as in the genus *Tisbe*. The 1st and 2nd maxillæ (Text-fig. 15, E, F) also very closely resemble the corresponding appendages in *Machairopus*. As regards the maxilliped, Monard has already called attention to its resemblance to that of the genus *Thalestris*.

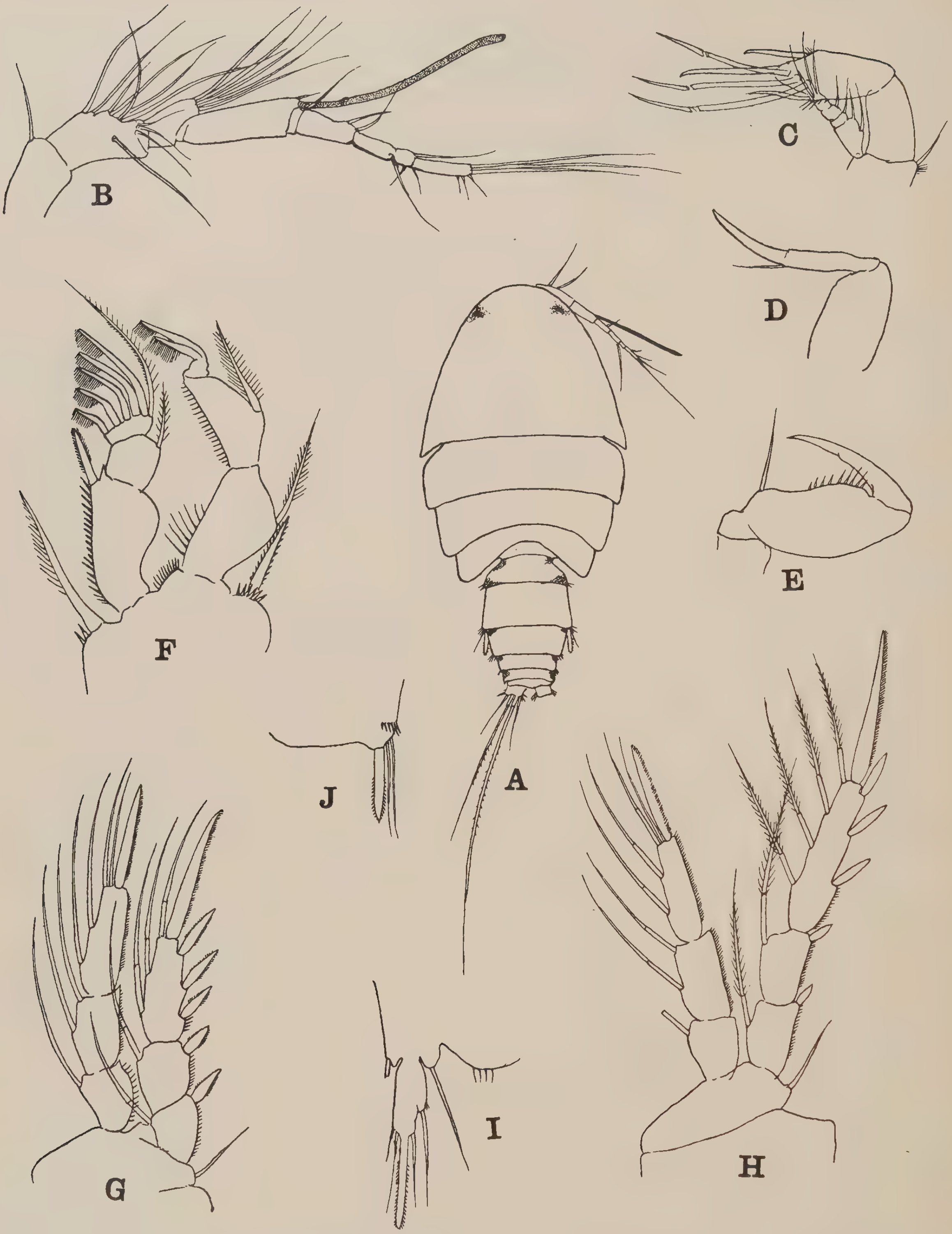
The 1st leg, as Monard points out, closely resembles that of *Machairopus minutus* Sars, but the 2nd segment of the exopod is unarmed. Monard states that the terminal segment bears one spine, five brush-like setæ and one plumose seta ; I have, however, been unable to detect the spine, though the setæ are quite clear.

In the 2nd–4th legs the proportional lengths of the endopod and exopod differ ; in leg 2 the endopod is longer than the exopod ; in leg 3 (Text-fig. 15, G) the rami are of the same length ; and in leg 4 the exopod is slightly the longer. In all three legs the 2nd segment of the endopod bears two setæ, thus placing the species in the genus *Scutellidium*.

In the 5th leg (Text-fig. 15, H) the basal segment is relatively narrow and bears a single seta at the external angle and two at the inner, while both inner and outer margins are fringed respectively with hairs and small needle-like spines. The oval distal segment in the present specimen bears six setæ, whereas Monard (*loc. cit.*, fig. xiv) figures only five.

♂. Total length, 0·6 mm.

The anterior and posterior regions of the body (Text-fig. 16, A) have the proportional



TEXT-FIG. 16.—*Scutellidium machairopoides* (Monard). ♂. A, Male, dorsal view. B, 1st antenna. C, 2nd antenna. D, 2nd maxilla. E, Maxilliped. F, 1st leg. G, 2nd leg. H, 4th leg. I, 5th leg. J, Genital armature.

lengths of 58 to 42. The proportional lengths of the segments of the posterior region are as follows:

Segment Th. 5.	Abd. 1.	2.	3.	4.	5.	Furca.
13	32	17	13	11	6	8 = 100

The forehead is rounded and, as in the female, two widely separated purple-coloured spots lie behind and to the outer side of the articulation of the 1st antenna. The segments of the posterior region are armed with spines on the posterior and lateral margins. The genital segment is swollen, and the genital aperture is armed (Text-fig. 16, J) with a stout, backwardly-directed, serrated spine, on the outer side of which arise two delicate setæ.

The furcal rami are short and broad, and the 2nd furcal seta is long.

The 1st antenna (Text-fig. 16, B) forms a grasping organ. The proximal segments are not markedly swollen; the 3rd segment is short, and the 4th long and bears a sensory seta. The hinge-joint lies between the 6th and 7th segments.

The 5th leg (Text-fig. 16, I) is armed with a stout serrated spine, that is as long as the distal segment; two setæ arise from the inner margin and two unequal delicate setæ from the outer distal angle of the free segment.

Distribution.—Up to the present time this species has only been recorded from the Mediterranean Sea (Monard) and the Brittany Coast, Roscoff (Monard). If I am correct in the identification of this form the range must now be extended to the Nicobar Islands.

Scutellidium plumosum Brady. (Text-fig. 17, A–I, ♀; Text-fig. 18, A–H, ♂.)

Scutellidium plumosum, Brady, 1899, p. 45, pl. cii, figs. 16–21, 23–25.
Psamathe plumosum, Lang, 1934, p. 18, figs. 33–39.

Occurrence.—Nankauri Harbour, Nicobar Islands, in weed-washings.

Descriptive Notes.—♀. Total length, 0·60 mm.

In the general proportions of the body this species closely resembles the preceding two species.

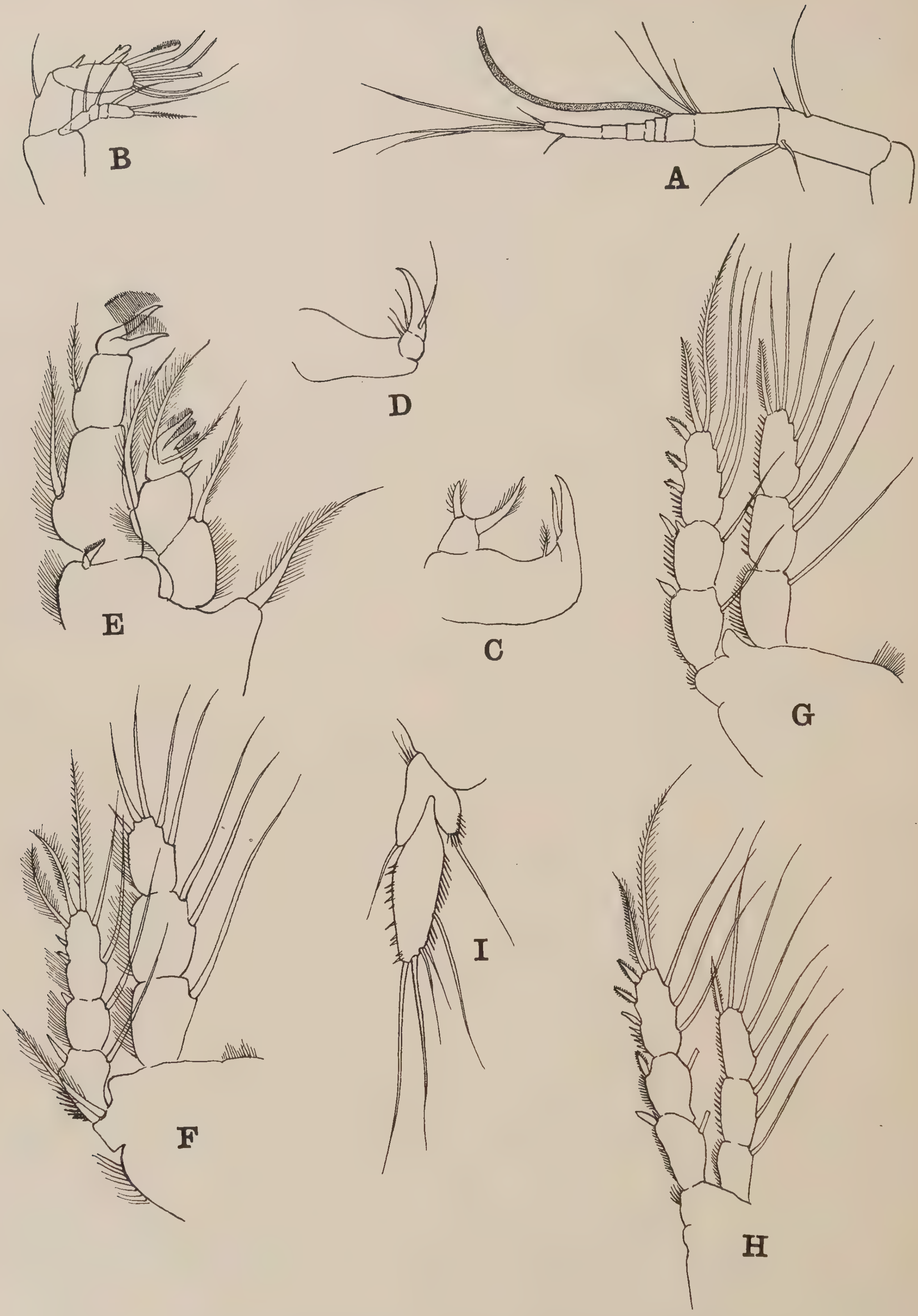
The segments of the 1st antenna (Text-fig. 17, A) are very difficult to make out. The first three segments are long and comparatively slender; the 4th segment, though of the same or very similar breadth to the preceding three, is short, and this is followed by a distal portion of four or five segments, the width of which is considerably less. The proportional lengths of the segments appear to be as follows:

Segment	1.	2.	3.	4.	5.	6.	7.	8.	9.
	16	32	25	6	2	2	3	4	10 = 100
(Lang)	12	32	18	5	4	5	3	6	15 = 100

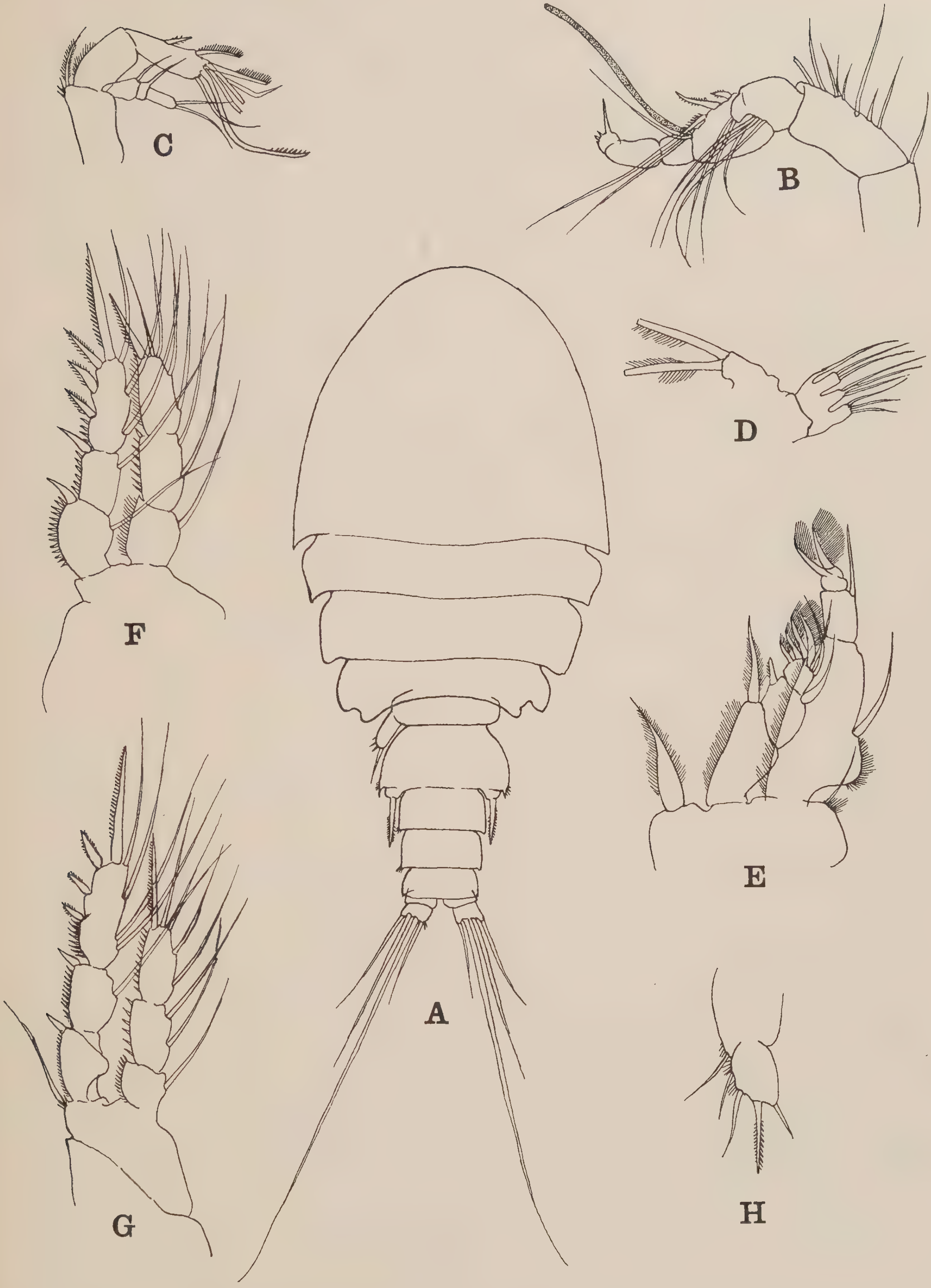
In the 2nd antenna (Text-fig. 17, B) the main ramus is composed of three comparatively short segments, of which the distal appears to bear two brush-like spines, three geniculate setæ and two simple setæ. The exopod is comparatively well developed and is composed of four segments.

The 2nd maxilla (Text-fig. 17, C) exhibits a well-developed lobe, bearing two stout setæ, near the base of the penultimate segment, very similar to that possessed by *Machairopus minutus* Sars (*vide* Sars, 1903–11, pl. l, fig. mp^1) and *Scutellidium machairopoides* (Monard) (*vide* text-fig. 15, F).

In the 1st leg (Text-fig. 17, E) the exopod is relatively short, and does not reach as far



Text-fig. 17.—*Scutellidium plumosum* Brady, ♀. a, 1st antenna. b, 2nd antenna. c, 2nd maxilla. d, Maxilliped. e, 1st leg. f, 2nd leg. g, 3rd leg. h, 4th leg. i, 5th leg.



Text-fig. 18.—*Scutellidium plumosum* Brady, ♂. A, Male, dorsal view. B, 1st antenna. C, 2nd antenna. D, Maxillary palp. E, 1st leg. F, 2nd leg. G, 4th leg. H, 5th leg.

as the distal end of the 1st segment of the endopod. The seta at the distal inner angle of the 2nd basal segment is very small.

In the 2nd–4th legs (Text-fig. 17, F, G and H) the 2nd segment of the endopod bears two setæ. In the 2nd leg the exopod is considerably shorter than the endopod and reaches only to the end of the 2nd segment. The 3rd segment of the exopod in the specimen examined was abnormal and carried on the outer margin two small marginal spines, then a plumose seta and an end spine. In the 3rd leg the terminal segment of the exopod carried three marginal spines, of which the proximal is smaller than the other two. The two rami are of nearly equal length. In the 4th leg the endopod is considerably shorter than the exopod, and here too the proximal marginal spine on the 3rd segment of the exopod is smaller than the other two.

The 5th leg (Text-fig. 17, I) is somewhat similar to that of *S. longicauda.*

The specimen was a mature female, and was carrying an egg-sac containing only 9–10 ova.

In weak formalin the specimen was of a yellowish colour, and a well-marked broad transverse bar of pink or mauve ran across the dorsal region of thoracic segments 2, 3 and 4.

♂. Total length, 0·53 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 18, A) are as 67 to 33. The postero-lateral margin of the 4th thoracic segment is distinctly notched.

The proportional lengths of the segments of the posterior region are as follows :

Segment Th. 5.	Abd. 1.	2.	3.	4.	5.	Furca.
15	24	17	16	13	7	8 = 100

The genital segment is armed at each postero-lateral angle with a stout, backwardly-directed serrated spine. The 5th abdominal segment is almost completely telescoped into the 4th.

The 1st antenna (Text-fig. 18, B) forms a grasping organ, the 4th segment being swollen and bearing two unequal spines on its anterior margin, the proximal being the smaller.

In the 2nd antenna (Text-fig. 18, C) the exopod appeared to consist of only three segments instead of four.

The 5th leg (Text-fig. 18, H) consists of a stout basal segment and a comparatively small distal segment, that is, pyriform. From the extreme tip arises a short seta, and from the outer margin spring two unequal setæ and a stout serrated spine. Lang (1934, fig. 38) figures only three setæ, the inner simple and the two outer plumose.

Distribution.—Up to the present time this species has only been recorded from the South-west Pacific Ocean (Brady, Lang) ; the present record extends its distribution to the tropical region of the Indian Ocean.

Family THALESTRIDÆ.

Genus *Phyllothalestris* Sars.

Phyllothalestris mysis (Claus).

Phyllothalestris mysis, Sars, 1903, p. 116, pls. lxx, lxxi; A. Scott, 1909, p. 214, pl. lxii, figs. 1–5; Monard, 1928, p. 344, fig. xvii, 1.
? *Phyllothalestris mysis*, f. *harringtoni*, Willey, 1935, p. 93, figs. 173–173*c*.

OCCURRENCE.—Addu Atoll, Maldive Archipelago, in weed-washings.

REMARKS.—As Willey (1935, p. 93) has pointed out, Sars in his figure of the 2nd leg has shown four setæ arising from the inner margin and distal end of the terminal segment of the exopod, and as the example that he found in Bermuda possessed only three setæ, in addition to the marginal and end-spines, on this segment, he considered it a variety and named it f. *harringtoni*. Neither Sars nor Monard have given any account of the number of setæ on this segment nor has Monard figured it, but A. Scott in his figure (1909, pl. lxii, fig. 1) shows only three setæ, as occurs in other species in the genus, and it would appear probable that Sars was either incorrect in his drawing—a suggestion that one hesitates to make in view of the extreme accuracy of his work—or else was dealing with an abnormal specimen. The form described by Willey differs, however, in the character of the free segment of the 5th leg; the angular projection at the distal end of the outer margin is absent and so is the large spine that replaces the usual 2nd seta, and it seems best to regard this form as representing a different species from *P. mysis* (Claus) with the name *P. harringtoni* Willey.

DISTRIBUTION.—Malay Archipelago (A. Scott), the Pearl Banks of Ceylon (Thompson and A. Scott), the Maldive Archipelago, the Gulf of Suez (Thompson and A. Scott), the Mediterranean Sea (Claus, Monard, Brian Car), the North Atlantic Ocean, Madeira (Fischer), the British Isles (Brady), and the coast of Norway (Sars).

Phyllothalestris orientalis sp. nov. (Text-fig. 19, A–H, ♀; Text-fig. 20, A–F, juv., ♀.)

OCCURRENCE.—Addu Atoll, Maldive Archipelago, in weed-washings; two females, one mature and the other in Stage V.

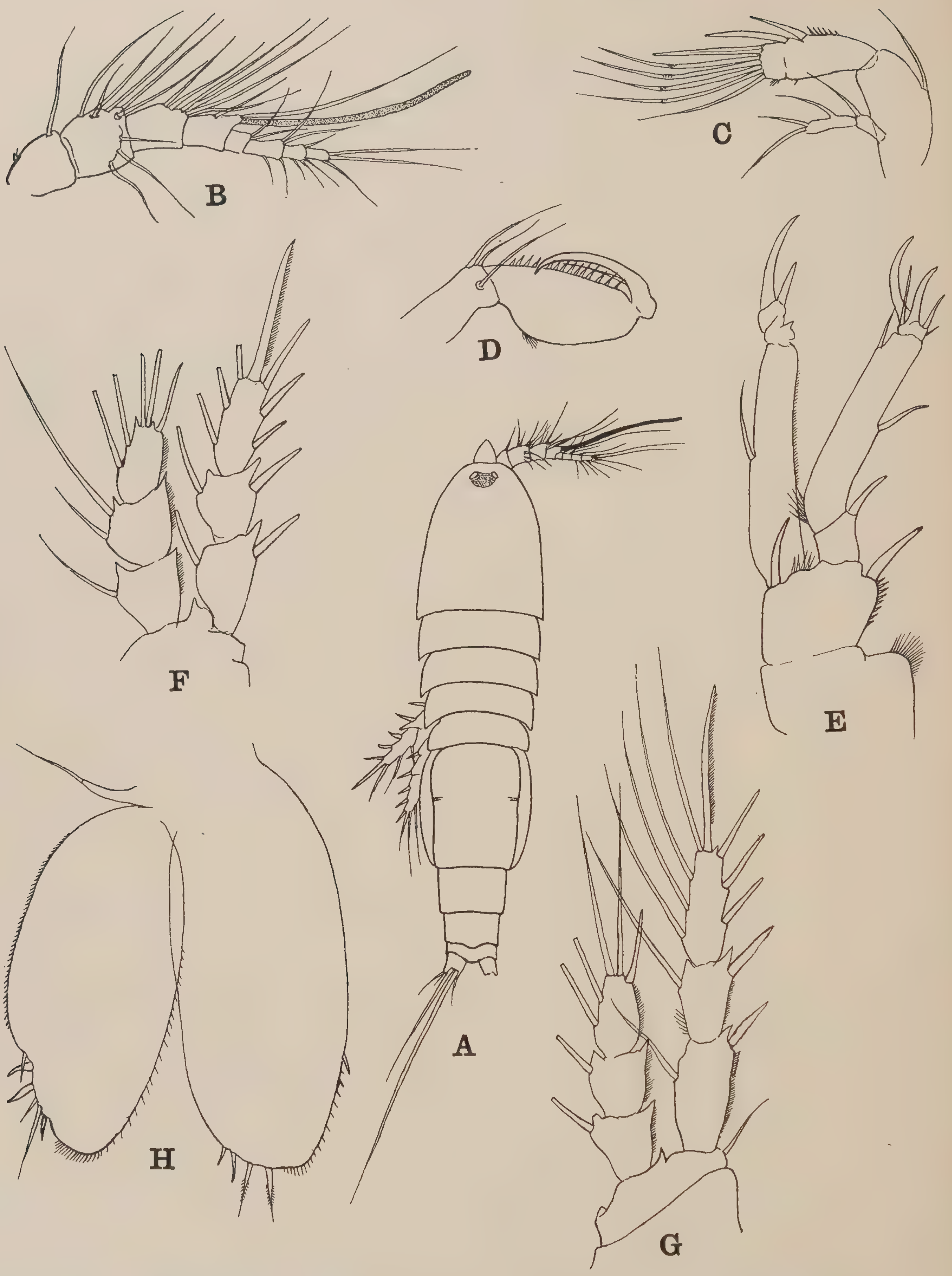
DESCRIPTIVE NOTES.—♀. Adult. Total length, 1·06 mm. The lengths of the anterior and posterior regions of the body are almost exactly equal. The general shape of the body (Text-fig. 19, A) is rather more slender than in *P. mysis* (Claus). The proportional lengths of the segments of the posterior region are as follows:

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
12	47	17	12	7	5 = 100

The genital segment is crossed on either side by a groove, that indicates the line of fusion of the two segments.

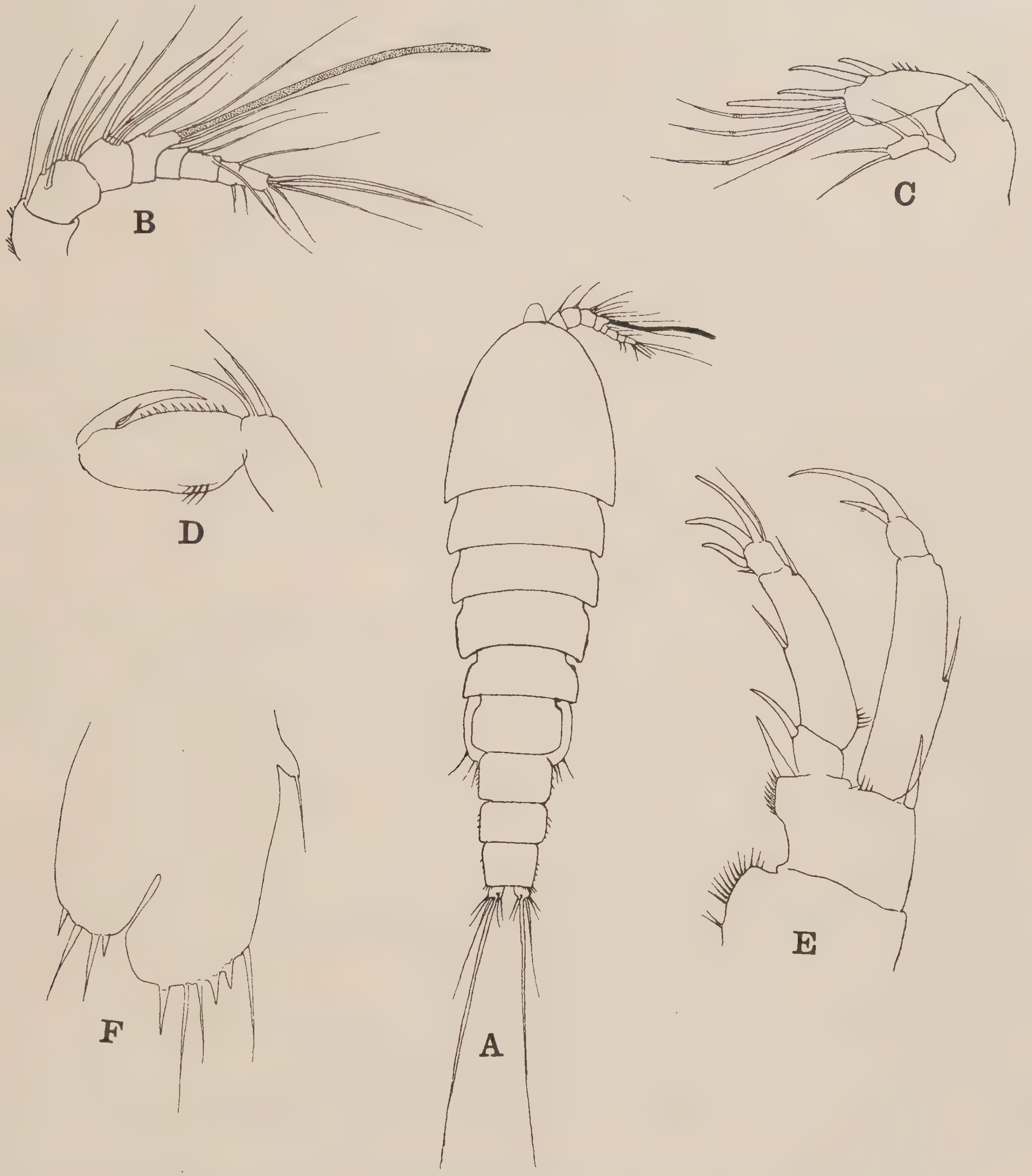
The 1st antenna (Text-fig. 19, B) reaches back about half the length of the cephalosome, and consists of only eight segments, instead of the usual nine; these have the following proportional lengths:

Segment 1.	2.	3.	4.	5.	6.	7.	8.
18	20	17	13	6	10	8	8 = 100



TEXT-FIG. 19.—*Phyllothalestris orientalis* sp. nov. A, Female, dorsal view. B, 1st antenna. C, 2nd antenna. D, Maxilliped. E, 1st leg. F, 2nd leg. G, 4th leg. H, 5th leg.

The first four segments are well developed, and a sensory filament arises from the distal end of the 4th; there are only four segments in the slender distal part of the appendage.



TEXT-FIG. 20.—*Phyllothalestris orientalis* sp. nov., ♀, juv. A, Dorsal view. B, 1st antenna. C, 2nd antenna. D, Maxilliped. E, 1st leg. F, 5th leg.

The 2nd antenna (Text-fig. 19, C) is robust and the exopod consists of two segments, of which the 1st bears one seta and the other three.

The maxilliped (Text-fig. 19, D) is more stoutly built than in *P. mysis* (Claus) and the "hand" is armed with a row of sharp spines along the anterior margin; the terminal claw is shorter and is more curved.

The 1st leg (Text-fig. 19, E) closely resembles that of *P. mysis*, but is somewhat more robust.

The 2nd leg (Text-fig. 19, F) has the usual two setæ on the 2nd segment of the endopod, and the terminal segment of the exopod bears three setæ on the inner margin and distal end; the end-spine and marginal spines are similar to those figured by Sars in *P. mysis* (Claus) (*loc. cit.*, pl. lxxi). The formula for the 2nd leg is as follows:

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P2	1	2	2, 2, 1	1	1	2, 2, 3

This species thus resembles *P. mysis*, f. *harringtoni* Willey.

The 5th leg (Text-fig. 19, H), as in *P. mysis*, consists of two foliaceous plates; but the shape of the outer, free segment differs from that of *P. mysis* in that the distal end is more sharply rounded and both the 2nd and 3rd setæ on the margin, counting from the outer side, are modified to form spines, but less stout and smaller than the single spine, corresponding to seta 2 of *P. mysis*.

Associated with the adult female was an immature stage (Stage V) that I think must be referred to the same species.

♀. Juv. Total length, 0·95 mm.

The proportional lengths of the anterior and posterior regions of the body are as 56 to 44. The body (Text-fig. 20, A) has the same somewhat slender shape and the genital segment is not widened. There are in this stage only four segments in the abdomen; segments 1 and 2 have not yet become fused and segments 4 and 5 are not yet differentiated. The proportional lengths of the segments of the posterior region are as follows:

Segment Th. 5.	Abd. 1.	2.	3.	4–5.	Furca.
15	22	22	16	18	7 = 100

Most of the appendages have already assumed the adult form, but the 5th legs (Text-fig. 20, F) have not yet become fully differentiated.

DISTRIBUTION.—At present known only from the Maldive Archipelago.

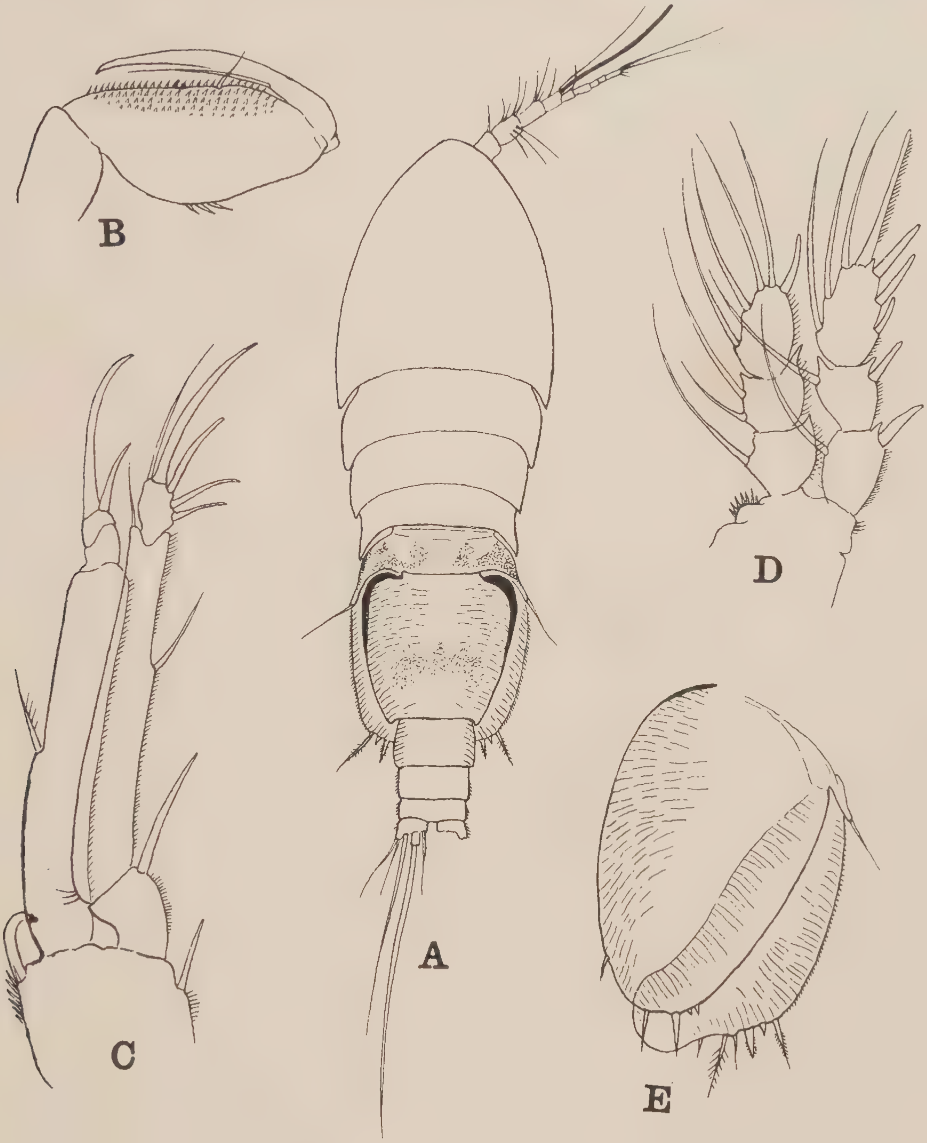
Phyllothalestris sarsi sp. nov. (Text-fig. 21, A–E, ♀; Text-fig. 22, A–F, ♂; Text-fig. 23, A–F, juv., ♂.)

OCCURRENCE.—Addu Atoll, Maldive Archipelago, in weed-washings; two females, one adult male and one immature male. Nankauri Harbour, Nicobar Islands; one female, in weed.

DESCRIPTIVE NOTES.—♀. Total length, 1·22 mm. The proportional lengths of the anterior and posterior regions of the body are as 55 to 45. In its general shape the body (Text-fig. 21, A) is more robust than in either *P. mysis* (Claus) or *P. orientalis* and the genital segment is considerably broadened. The proportional lengths of the segments of the posterior region are as follows:

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
12	48	16	12	7	5 = 100

The dorsal aspect of the genital segment is ornamented by a number of fine imbricated lines, and the lateral aspects of the 3rd segment are similarly marked. The sides of the 4th and 5th segments and the furcal rami are covered with small spinules. The furcal rami are considerably broader than long and the outer distal angle is somewhat produced.



TEXT-FIG. 21.—*Phyllothalestris sarsi* sp. nov., ♀. A, Female, dorsal view. B, Maxilliped. C, 1st leg. D, 2nd leg. E, 5th leg.

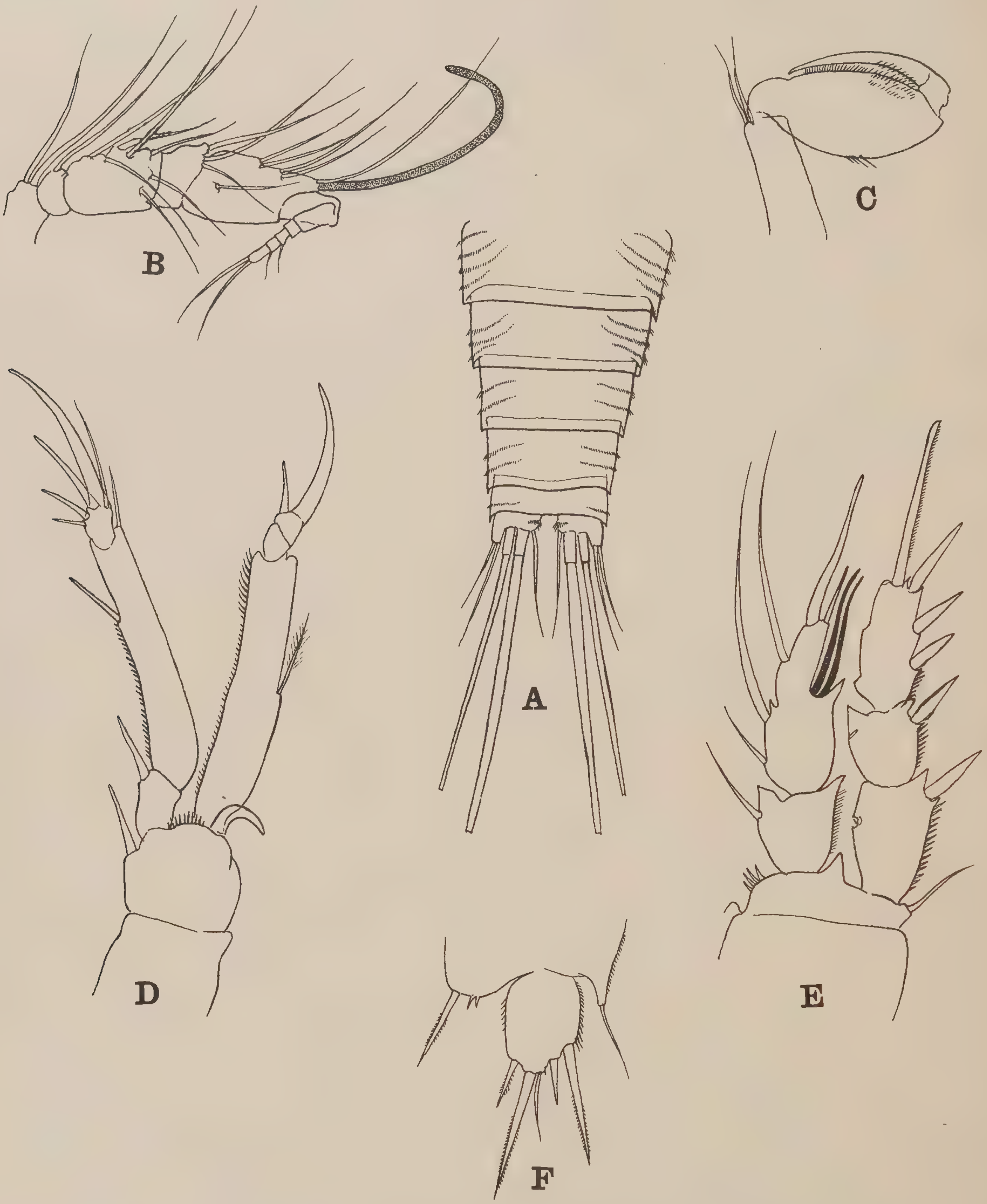
The 1st antenna reaches back to about two-thirds the length of the cephalosome ; it consists of nine segments, that have the following proportional lengths :

Segment 1.	2.	3.	4.	5.	6.	7.	8.	9.
25	21	16	9	6	7	5	4	7 = 100

The 2nd antenna is stoutly built and resembles that of *P. orientalis*.

The maxilliped (Text-fig. 21, B) is strong, and the anterior margin of the "hand" is covered with numerous rows of spinules.

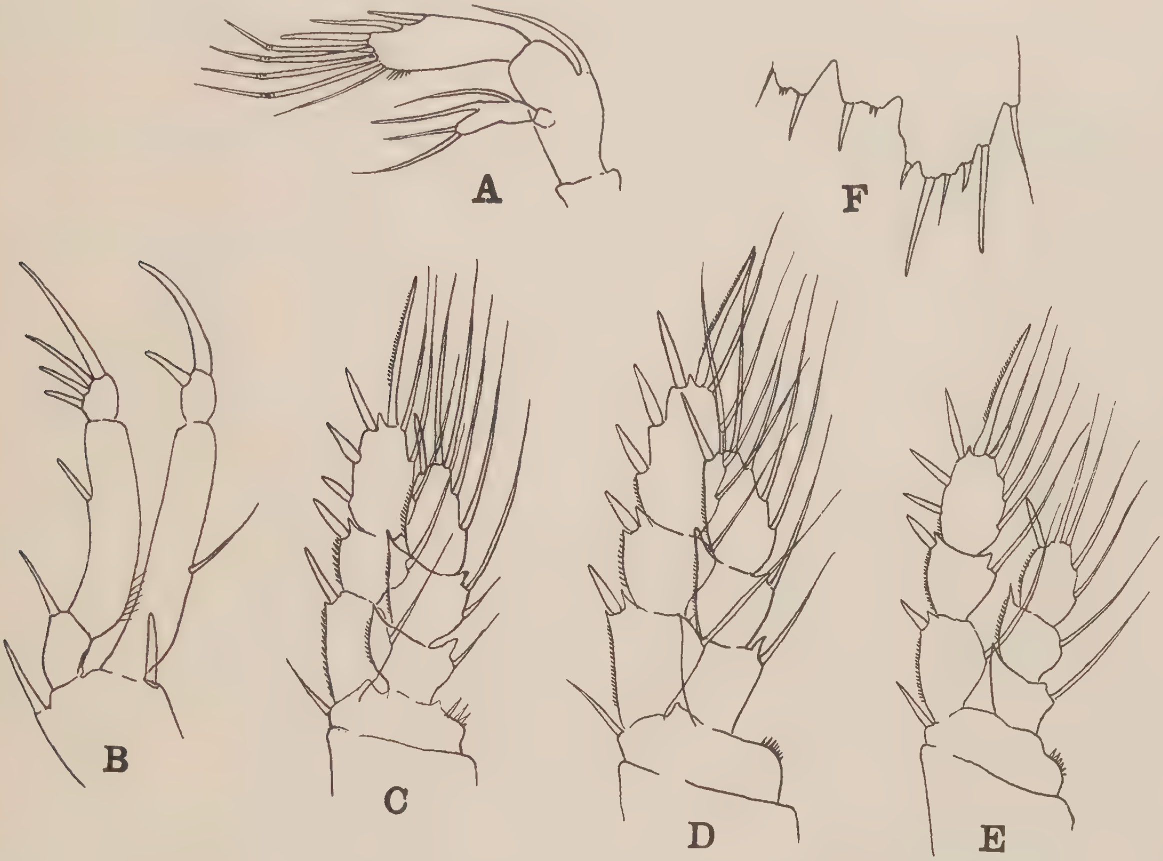
The 1st leg (Text-fig. 21, c) is long and slender and closely resembles that of *P. mysis* (Claus).



Text-fig. 22.—*Phyllothalestris sarsi* sp. nov., ♂. a, Male abdomen, dorsal view. b, 1st antenna. c, Maxilliped. d, 1st leg. e, 2nd leg. f, 5th leg.

In the 2nd leg (Text-fig. 21, d) the terminal segment of the endopod bears only three setæ on the inner margin.

The 5th leg (Text-fig. 21, e) possesses the foliaceous plates that are characteristic of the genus, but in details of structure these differ from other described species. The inner proximal plate is broad, and on the distal part of the margin from within outwards there is first a small seta, then at the distal end arises a delicate seta, followed by a moderately stout spine-like seta and finally two small spines. The outer distal segment is very markedly produced in a rounded lobe at the distal end ; on the outer margin this segment bears from without inwards a seta, then a small spine followed by a somewhat larger spine, which is succeeded by a small delicate seta and a larger plumose seta, and after a short interval by another delicate small seta. The surface of both segments is traversed by numerous fine imbricated lines.



TEXT-FIG. 23.—*Phyllothalestris sarsi* sp. nov., ♂, juv. A, 2nd antenna. B, 1st leg. C, 2nd leg. D, 3rd leg. E, 4th leg. F, 5th leg.

♂. The male of this species exhibits similar modifications from the female as are found in *P. mysis* (Claus).

The segments of the abdomen (Text-fig. 22, A) are traversed by lines of minute spinules or hairs, extending from the lateral region on to the dorsal aspect, but not meeting in the mid-dorsal line. On the 1st segment there are four such lines running upwards and somewhat forwards. On the 2nd segment there are three lines of spinules, while on the 3rd and 4th segments there are two lines and on the anal segment only a single row. A short row of similar spinules runs across the inner aspect of the furcal rami.

The 1st antenna (Text-fig. 22, B) is modified to form a grasping organ and appears to consist of a proximal part, in which the segments are somewhat swollen and are six in number, and a distal part, beyond the hinge-joint, consisting of five segments, the last four being quite small.

The spine on the distal inner angle of the 2nd basal segment of the 1st leg (Text-fig. 22, D) is modified and forms a curved hook.

In the 2nd leg (Text-fig. 22, E) the 2nd and 3rd segments of the endopod are fused together, though the line of demarcation between them is shown by a distinct notch in the inner border; from the proximal part of the combined segment (segment 2) arise two unequal setæ, the proximal being small and delicate, and beyond the notch another seta arises from the inner margin. From the distal end arise a large spine-like seta and a smaller spine, and from a deep notch in the outer margin spring two modified setæ. Thus, while closely resembling the corresponding appendage of *P. mysis* (Claus), this form differs in that the 2nd marginal seta of the terminal segment is modified to form a spine instead of being plumose.

The 5th leg (Text-fig. 22, F) agrees fairly closely with that of *P. mysis*, but the free segment is somewhat broader.

♂. Juv.

A single specimen of a young male in the 5th copepodid stage was taken in weed-washings in Addu Atoll.

In this stage the spine arising from the inner distal angle of the 2nd basal joint of the 1st leg (Text-fig. 23, B) is unmodified, and is quite straight instead of being curved.

In the 2nd leg (Text-fig. 23, C) the endopod consists of the normal three segments, segments 2 and 3 not having become fused, and the setæ arising from these segments are also normal.

The 5th leg (Text-fig. 23, F), though as yet not completely differentiated, clearly shows the characteristic form and spinulation of the adult.

I have much pleasure in dedicating this species to the late Prof. G. O. Sars, to whom we owe so much of our knowledge regarding the Harpacticoida and other Crustacea.

Distribution.—Up to the present time this species has only been taken in the Nicobar Islands and the Maldive Archipelago, but it is probably more widely distributed in Indian waters.

Genus *Rhynchothalestris* Sars.

Gurney (1927*c*, p. 502) has recorded the occurrence of *Rhynchothalestris rufocincta* (Norman) at both ends of the Suez Canal; A. Scott (1909, p. 215) previously had recorded its presence in the Malay Archipelago, and from the same locality he described a second species, *R. similis*, of which he states that he had only the female: at Station 164 (Siboga) he obtained 2 females and 2 males, and from Station 273 1 female and 1 male, all of which he attributes to *R. rufocincta* (Norman), and from this latter station he also got a single female of a different species, which he has named *R. similis*. In the present collection the same two species occur, but I believe that Scott has attributed the males to the wrong species, and that they should be referred to his new species, *R. similis*.

Rhynchothalestris rufocincta (Norman), Brady.

Rhynchothalestris rufocincta, Brady, 1880, p. 125, pl. lvii, figs. 1–9; Sars, 1903–11, p. 120, pls. lxxiii, lxxiv; A. Scott (♀ only), 1909, p. 215, pl. lxii, figs. 12–16; Gurney, 1927*c*, p. 502.
Rhynchothalestris vanhöffeni, Brady, 1910, p. 532, fig. xxiii.

Occurrence.—At "Investigator" Station 669, Perseus Reef, Camorta Island, Nicobar Islands, in weed-washings; a single female.

Descriptive Notes.—♀. Total length, 0·91 mm. Sars gives the length of specimens from the coast of Norway as "slightly exceeding 1 mm.", and Scott's specimens were 0·98 mm.

The proportional lengths of the anterior and posterior regions are as 62 to 38. The rostrum is acutely pointed but, as it is curved ventrally and is bent downwards, it appears to be rounded when viewed from the dorsal aspect.

The proportional lengths of the segments of the posterior region of the body are as follows:

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
14	43	15	12	11	5 = 100

The postero-lateral angles of the 4th thoracic segment are produced backwards in pointed wings, and the posterior corners of the genital and next succeeding segment are also produced backwards, while the margins of these segments are fringed with short hairs.

The 1st antenna reaches back only about half-way along the cephalosome; the proportional lengths of the segments are as follows:

Segment 1.	2.	3.	4.	5.	6.	7.	8.	9.
23	20	16	13	5	8	4	4	7 = 100

The 4th segment is decidedly shorter than the 3rd.

The 2nd antenna and mouth-parts appear to be exactly as described and figured by Sars (*loc. cit.*).

The 1st pair of legs agree in general form with the description and figures given by Sars and Monard, but seem to be on the whole rather more delicate.

The 2nd, 3rd and 4th legs agree with previous descriptions.

The 5th leg differs in small details; the proximal segment appears to be somewhat shorter than in the European form and reaches only as far as the junction of the middle and distal thirds of the distal free segment, which appears to be rather more elongate-oval in shape, being longer and narrower than in the European form, and more nearly approaching the form as described and figured by A. Scott (*loc. cit.*, pl. lxii, fig. 15, A).

The example was ovigerous, carrying an egg-sac containing about 24 ova.

I can detect no valid distinction between this species and the form described from the Cape of Good Hope, Simon's Bay, under the name *R. vanhöffeni* (*vide* Brady, 1910, p. 532, fig. xxiii).

Distribution.—The Malay Archipelago (A. Scott), the Nicobar Islands and Maldive Archipelago (present collection), the Gulf of Suez and the Suez Canal (Gurney), the Cape of Good Hope (Brady, as *R. vanhöffeni*), the North Atlantic Ocean, Madeira (Fischer) and Bermuda (Willey), the Mediterranean Sea (Monard, Brian), the British Isles (Norman, Brady), the coast of Norway (Sars) and Greenland (Jespersen).

Rhynchothalestris similis A. Scott. (Text-fig. 24, A–H, ♀; Text-fig. 25, A–G, ♂.)

Rhynchothalestris similis, A. Scott, 1909, p. 215, pl. lxii, figs. 6–11 (♀ only).
Rhynchothalestris rufocincta, ♂, A. Scott, 1909, p. 215, pl. lxii, figs. 17–20.

Occurrence.—Addu Atoll, Maldive Archipelago, in weed-washings; one female and one male.

Descriptive Notes.—♀. Total length, 1·03 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 24, A) are as 58 to 42; the posterior region would thus appear to be somewhat longer than in the preceding species. The rostrum is large and is acutely pointed anteriorly. The segments of the posterior region have the following proportional lengths:

Segment Th. 5	Abd. 1–2.	3.	4.	5.	Furca.
12	43	17	13	11	4 = 100

Both the 4th and 5th thoracic segments and the genital segment are produced at their postero-lateral angles and are fringed on the margins with small spinules. The 3rd, 4th and 5th abdominal segments are fringed with minute spinules.

The 1st antenna (Text-fig. 24, B) is composed of nine segments and reaches back a little beyond half the length of the cephalosome; it thus appears to be a little longer than in the preceding species. The proportional lengths of the segments are as follows:

Segment 1.	2.	3.	4.	5.	6.	7.	8.	9.
22	18	14	14	6	9	6	4	7 = 100

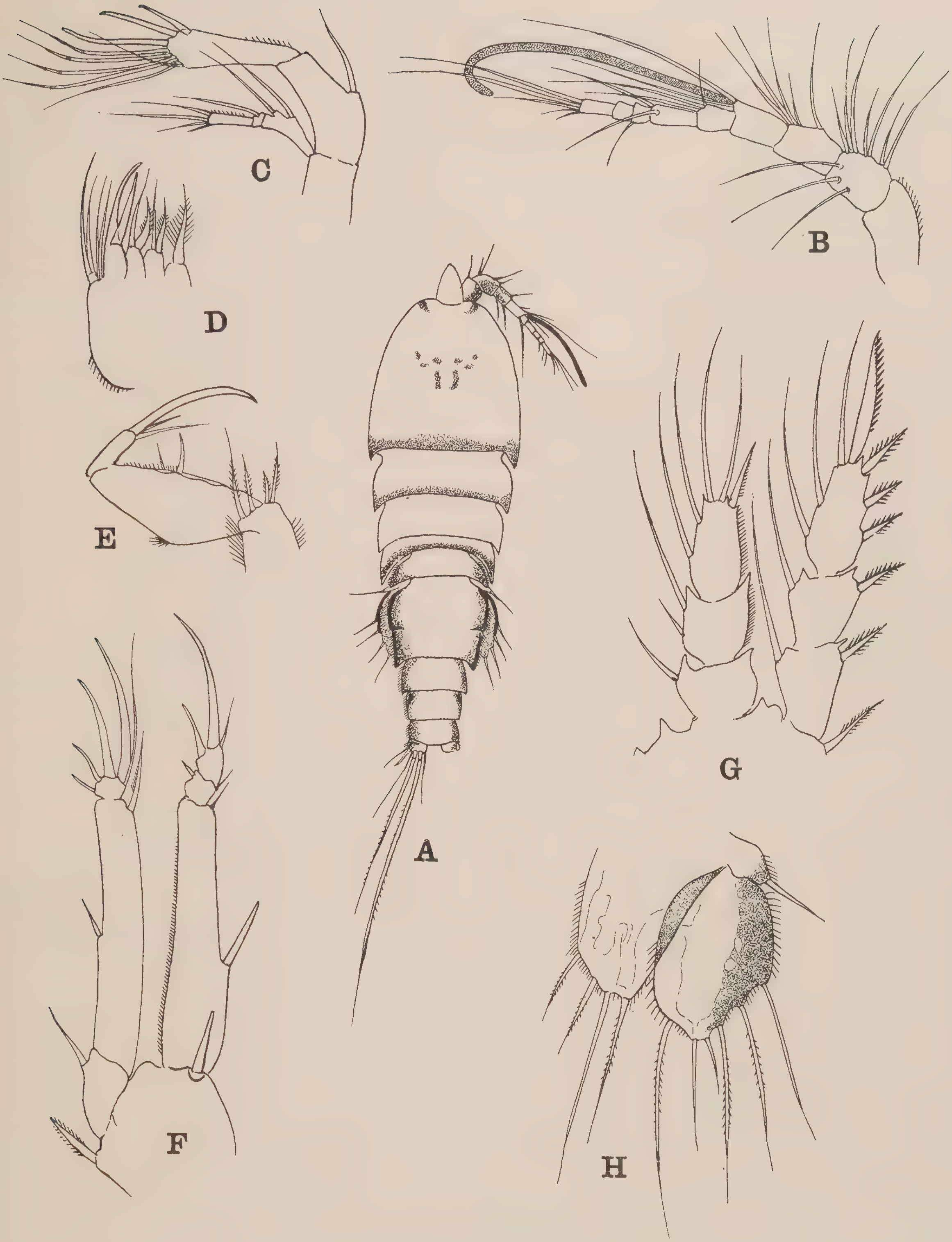
The 4th segment is of the same length as the 3rd. The 2nd antenna (Text-fig. 24, C), mouth-parts and swimming-legs appear to agree with those of the preceding species.

In the 5th leg (Text-fig. 24, H) the basal segment is produced in a flap that extends as far as the junction of the third and fourth quarters of the distal segment and bears four setæ instead of five; of these the 2nd, counting from without inwards, is the longest and the two inner setæ are small and subequal. A. Scott (*loc. cit.*, pl. lxii, fig. 10) figures a very minute sixth seta, the innermost, but I was unable to detect it in the specimen examined by me. The distal segment is broadly oval and bears six setæ; three subequal setæ arise from the outer margin, two smaller and unequal setæ from the distal extremity and one, equal in length to the outer seta, from the distal end of the inner margin. Both inner and outer borders are fringed with hairs.

In colour this species is yellowish brown, with purple-brown bands across the posterior margins of the cephalosome and the 2nd thoracic segment; there are also some pigmented patches on the cephalosome in the position indicated (*vide* Text-fig. 24, A). The posterior margin of the 4th thoracic segment and the lateral borders of the abdominal segments are tinted with the same purple-brown colour, and the outer border of the free segment and the basal segment of the 5th leg are also similarly pigmented.

♂. Associated with this female was a male. As in *R. rufocincta*, this specimen exhibited modifications in the endopod of the 2nd and 3rd legs. In the 2nd leg (Text-fig. 25, D), the two terminal segments of the endopod are fused, though a notch in both the inner and outer margins indicates the limits of each portion. The inner seta arising from the distal end of the joint is modified, as in *R. rufocincta*, but the shape of this modified seta differs appreciably from that of *R. rufocincta*, as figured by Sars (1903–11, pl. lxxiv) and Monard (1928, fig. xviii, 1), and agrees exactly with the figure given by A. Scott (1909, pl. lxii, fig. 18) for the form which he believed to belong to *R. rufocincta*. In the 3rd leg (Text-fig. 25, E) the modification of the endopod agrees closely with that found in *R. rufocincta*.

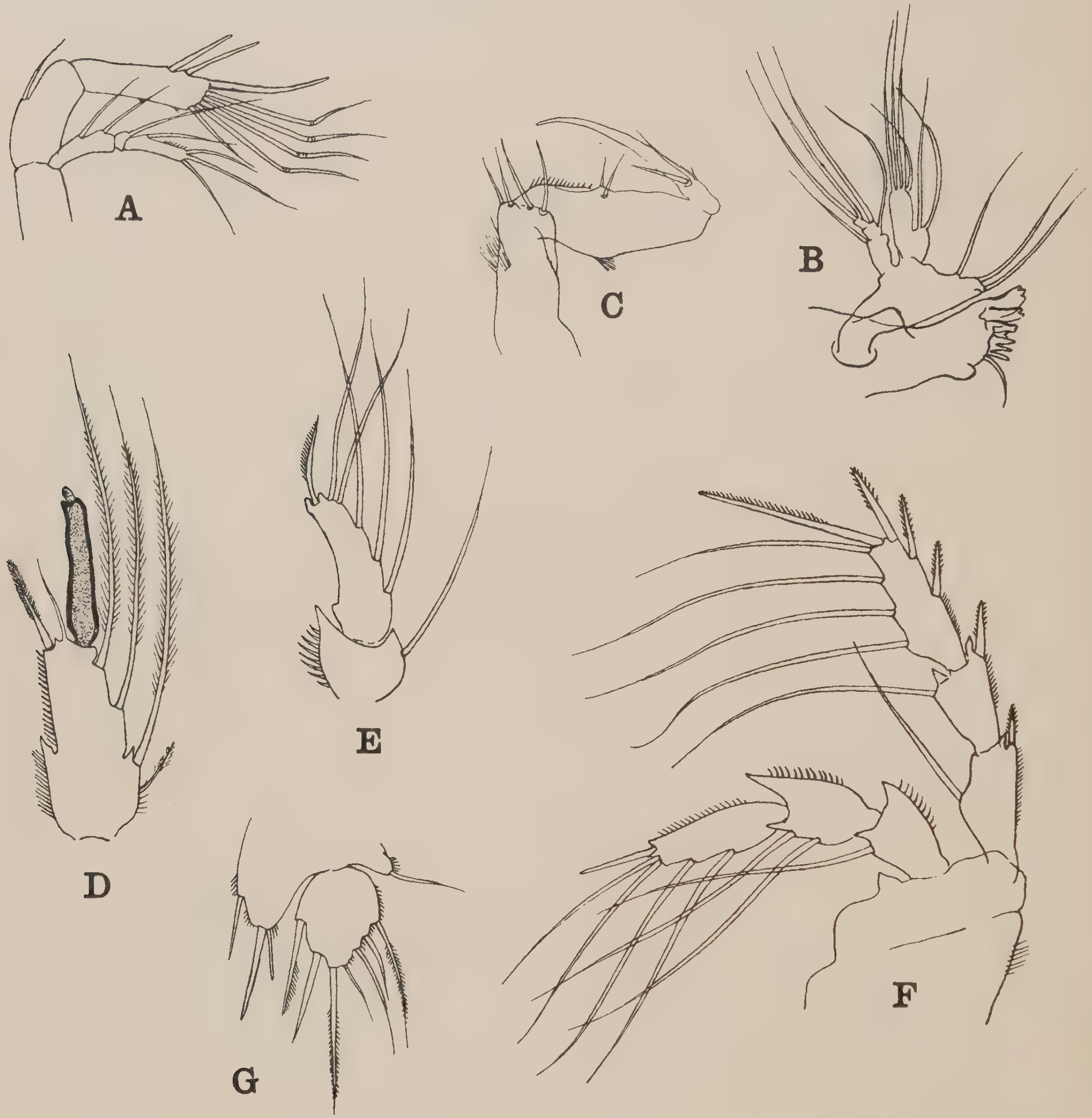
The 5th leg (Text-fig. 25, G) also agrees with that of *R. rufocincta*.



TEXT-FIG. 24.—*Rhynchothalestris similis* A. Scott, ♀. A, Female, dorsal view. B, 1st antenna. C, 2nd antenna. D, 2nd maxilla. E, Maxilliped. F, 1st leg. G, 2nd leg. H, 5th leg.

Distribution.—Up to the present time this species has only been recorded from the Malay Archipelago (A. Scott) and the Maldive Archipelago.

Such differences as exist between this species and *R. rufocincta* are very slight, and it may well be doubted whether these forms really represent different species. In a species that is so widely distributed as *R. rufocincta* it is only to be expected that variations will be found to occur, and it is possible that *R. similis* A. Scott is merely an Indo-Pacific race of *R. rufocincta* (Norman).



Text-fig. 25.—*Rhynchothalestris similis* A. Scott. A, 2nd antenna. B, Mandible. C, Maxilliped. D, Terminal segment of endopod of 2nd leg. E, Endopod of 3rd leg. F, 4th leg. G, 5th leg.

Genus *Parastenhelia* Thompson and A. Scott (= *Microthalestris* Sars).

This genus was created by Thompson and A. Scott (1903, p. 263) to accommodate two species taken on the Ceylon Pearl Banks, *P. hornelli* and *P. similis*; later Sars (1903–11, p. 122) created the genus *Microthalestris*, to which he assigned two species, *M. forficula* (Claus) (=*Thalestris forficula* Claus) and *M. littoralis* Sars. Lang (1934, p. 22 *et seq.*) has discussed the relationship of these two genera and has reached the conclusion that they are synonymous, thus *Microthalestris* becomes a synonym of *Parastenhelia*. Lang has also called attention to the great degree of variability that is found within the limits of this genus, and this is very clearly seen in the setal formula of various species. The number of setæ on the swimming-legs 2–4 reaches its maximum in *P. anglica* Norman and T. Scott, in which it would appear to be as follows:

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P2	1	1	1, 2, 1	1	1	1, 2, 3
P3	1	1	2, 2, 1	1	1	2, 2, 3
P4	1	1	2, 2, 1	1	1	3, 2, 3*

* *Vide* Norman and T. Scott, 1906, pl. xiv, fig. 6.

In the other two species that were originally referred to the genus *Parastenhelia*, *P. hornelli* and *P. similis*, as well as in the species *P. antarctica* T. Scott (=*P. gracilis* Brady) the setal formula for the 4th leg is as follows:

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
4	1	1	2, 2, 1	1	1	2, 2, 3

In *Parastenhelia forficula* (Claus) the setal formula according to Sars (*vide* Sars, 1903–11, pl. lxxvi) is—

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P2	1	1	1, 2, 1	1	1	1, 2, 3
P3	1	1	2, 2, 1	1	1	2, 2, 3
P4	1	1	1, 2, 1	0	1	2, 2, 3

but in *P. forficuloides* (T. Scott), which most authors seem to consider as being synonymous with *P. forficula*, there is an additional seta on the terminal segment of both the endopod and exopod of the 4th leg, so that the formula for this appendage is—

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P4	1	1	2, 2, 1	0	1	3, 2, 3

and this additional seta on the 3rd segment of the exopod of the 4th leg also occurs in *P. littoralis*, f. *penicillata* described by Willey from the Wood's Hole Region of the coast of North America.

Lang (1934, p. 30) gives the formula for the form which he regards as *P. forficula* var. *littoralis* as follows :

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P2	1	1	1, 2, 1	1	1	1, 2, 3
P3	1	1	2, 2, 1	0	1	2, 2, 3
P4	1	1	1, 2, 1	0	1	2, 2, 3

There is also a variation in the number of segments composing the 1st antenna. Claus (1863, p. 131), in his original description of *P. forficula*, both states that there are present and figures only eight segments ; Sars, however, states that there are nine, and T. and A. Scott record and figure nine segments in their account of *P. forficuloides*. Similarly, *Parastenhelia anglica* Norman and T. Scott, *P. hornelli* Thompson and A. Scott and *P. similis* Thompson and A. Scott all have nine segments in the 1st antenna. Both T. Scott (1894, p. 100) and Monard (1928, p. 348), when describing individuals that they referred to *P. forficula*, state that this appendage was composed of eight segments, but the character of the 5th leg clearly shows that they were dealing with examples that belong to the form described by Sars as *littoralis*. Lang (1934, p. 26) in his examples of *littoralis* from the Antarctic found nine segments ; and Willey in examples taken in the Wood's Hole region of N. America found that typical examples possessed nine segments, but that a variety, that he named f. *penicillata*, possessed only eight.

The character of the inner furcal seta exhibits a considerable range of variation. Claus in his account of *P. forficula* describes and clearly figures (1863, pl. xvii, fig. 8) the inner seta as swollen at the base, and Sars (1903–11, p. 123, pl. lxxvi, F) states that they are " abruptly bent at the base " and figures them as slightly enlarged ; T. Scott in his account of *P. forficuloides* shows them as being markedly swollen.

In *P. littoralis* Sars states that these furcal setæ are " simple, none of them being conspicuously dilated at the base ", whereas Lang remarks, " die innere Furcalborste an der Basis verbreitert ist ", and in his figure (1934, fig. 49*a*, *b*) shows this as being enlarged and in some examples abruptly bent. Finally, Willey in his account of *P. littoralis* f. *penicillata* (1935, p. 82, fig. 124) figures both the 2nd and 3rd setæ as being greatly swollen at the base, and remarks that this form " possesses the forcipately curved caudal setæ (with swollen bases) of *M. forficula* ".

Finally, in the character of the 5th pair of legs of the male there appears to be a certain degree of variability. In the male of *P. forficula* the outer free segment, according to Sars (1903–11, pl. lxxvi, p. 5), is composed of three separate joints, and exactly the same type of appendage occurs in the male of *P. hornelli* Thompson and A. Scott (1903, p. 263, pl. vii, fig. 10). On the other hand, in *P. forficuloides* (T. and A. Scott) this joint is unsegmented (*vide* T. Scott, 1894, pl. x, fig. 24), and according to most observers in *P. littoralis* also this free segment of the 5th leg is entirely undivided (*vide* Willey, 1935, p. 82, fig. 126, and Monard, 1937, p. 54, fig. 3, D) ; but Lang (1934, p. 27, fig. 56) both describes this appendage as follows—" 5 Bein stimmt beinahe ganz mit dem von *P. hornelli* überein ", and clearly figures the triple division of the free segment. This has led Monard (1937, p. 51) to postulate a dimorphism in the males, but such a suggestion can only be accepted if we also accept the view that *P. forficula* and *P. littoralis* are synonyms and represent different forms of the same species. Monard has apparently recently adopted this attitude; in 1935 he recorded both forms from Roscoff, and remarked that the males of *M. forficula* obtained in that locality exhibited the subdivision of the free segment into three joints, but in 1937 he describes the form taken in the Mediterranean under the name *P. forficula littoralis*, and shows the 5th leg as having an undivided free segment. Lang (1934, p. 25) also regards the *littoralis* form as a variety of *forficula*. I cannot but suspect that both these authors, and possibly many others before them, were dealing with a mixture of both forms or, as I prefer to regard them, species, and that the males of *P. hornelli* Thompson and A. Scott and *P. forficula* (Claus) possess a 5th leg in which the free segment is subdivided into three joints, whereas in *P. littoralis* Sars and *P. forficuloides* (T. and A. Scott) this segment is, as is usual, unsegmented.

Parastenhelia littoralis (Sars). (Text-fig. 26, A–K.)

Microthalestris littoralis, Sars, 1903–11, p. 369, Suppl. pl. xi, fig. 1; Wilson, 1932, p. 205, fig. 136.
Microthalestris forficula, Monard, 1928*a*, p. 348, fig. xviii, 2.
Thalestris forficula, Thomson, 1883, p. 104, pl. x, figs. 16–21.

OCCURRENCE.—Addu Atoll, Maldive Archipelago, in weed-washings.

DESCRIPTIVE NOTES.—♀. Total length, 0·44–0·56 mm. The proportional lengths of the anterior and posterior regions of the body (Text-fig. 26, A) are as 55 to 45. The proportional lengths of the segments of the posterior region are as follows :

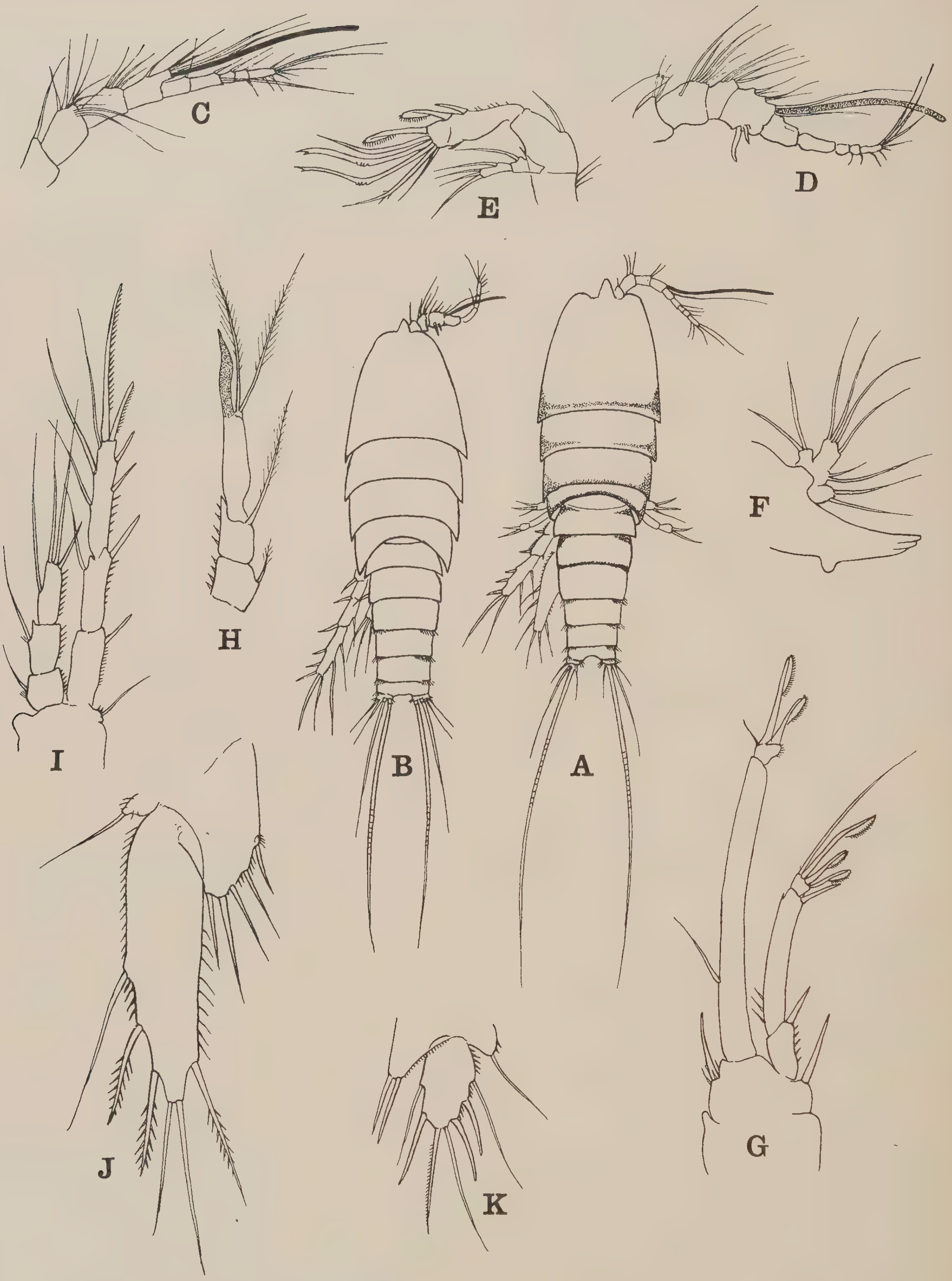
Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
16	40	15	13	13	3 = 100

The posterior margins of abdominal segments 2 to 4 and the articular margin of segment 5 are fringed with rows of small spines, which do not meet in the dorsal region. The base of the large 2nd furcal seta is in most cases normal, though in a few instances it appears to be slightly swollen, but this is never as marked as in the following form. In no instance was the 3rd furcal seta enlarged at the base.

The 1st antenna (Text-fig. 26, C) consists of nine segments, that have the following proportional lengths :

Segment	1.	2.	3.	4.	5.	6.	7.	8.	9.
	15	19	17	13	10	10	4	4	8 = 100
(Lang)	14	20	15	12	8	8	7	5	10 = 99

In the 2nd antenna (Text-fig. 26, E) the exopod is composed of two segments. The terminal segment of the endopod bears three spines, of which the 2nd and 3rd are furnished with a fringe of spines; Monard in his account of *Microthalestris forficula* states that "AII forte, a deuxième article portant 3 fortes épines dont 2 munies de brosse". As I have indicated in the reference list, Monard has mistaken the species with which he was dealing and his account refers to *P. littoralis*. In the present specimens in addition to the spines the terminal segment of the endopod carried four geniculate setæ, of which the 2nd and 3rd show a distinctly bifid termination.



Text-fig. 26.—*Parastenhelia littoralis* (Sars). A, Female, dorsal view. B, Male, dorsal view. C, 1st antenna, female. D, 1st antenna, male. E, 2nd antenna. F, Mandible. G, 1st leg. H, Endopod of 2nd leg, male. I, 4th leg. J, 5th leg, female. K, 5th leg, male.

In the 1st leg (Fig. 26, G) the endopod in the present specimens possesses the same general structure as in *P. forficula* and agrees with the accounts of this appendage as given by Monard and Lang, but the exopod is distinctly shorter than usual.

The 2nd–4th legs very closely resemble those of *P. forficula.*

The 5th pair (Text-fig. 26, K) of legs has the same general form as in *P. forficula*, but the free distal segment bears only 6 setæ, instead of 8 as in *P. forficula*; the basal segment bears 5 setæ.

In the fresh state these specimens exhibited a very beautiful coloration; the general colour was a pale fawn, with purple-brown markings at the sides and along the posterior margins of the cephalosome and the 2nd–4th thoracic segments; the 5th thoracic segment and the genital segment were stained with the purple brown at their anterior lateral regions, and a narrow band of this colour ran across the middle of the dorsal aspect of the genital segment, indicating the line of junction of the segments 1 and 2.

Associated with these females was a single male (Text-fig. 26, B) that agrees closely with the description of the male given by Monard (*loc. cit.*, 1928, under the name *M. forficula*). The free segment of the 5th leg (Text-fig. 26, K) was composed of a single piece, and was not subdivided into three, as Sars has shown to be the case in *P. forficula.*

DISTRIBUTION.—This species appears to be widely distributed, but its exact limits are very uncertain owing to certain authors holding different opinions regarding the question whether this species is specifically distinct from *P. forficula.* Lang (1934, p. 25) has recorded *P. forficula* var. *littoralis* from the Antarctic region, and other observers have recorded the form from New Zealand (Thomson, as *M. forficula*), the Maldive Archipelago (present record), the coast of Massachusetts, Woods Hole region (Wilson), Chesapeake Bay (Wilson), the Mediterranean Sea (Monard, Brian, Steuer), the English Channel (Monard), the west coast of Ireland (Farran) and the coast of Norway (Sars).

Parastenhelia littoralis, f. *penicillata* (Willey). (Text-fig. 27, A–J.)

Microthalestris littoralis f. *penicillata*, Willey, 1935, p. 82, figs. 119, 120, 122–126.

OCCURRENCE.—Addu Atoll, Maldive Archipelago, in weed-washings.

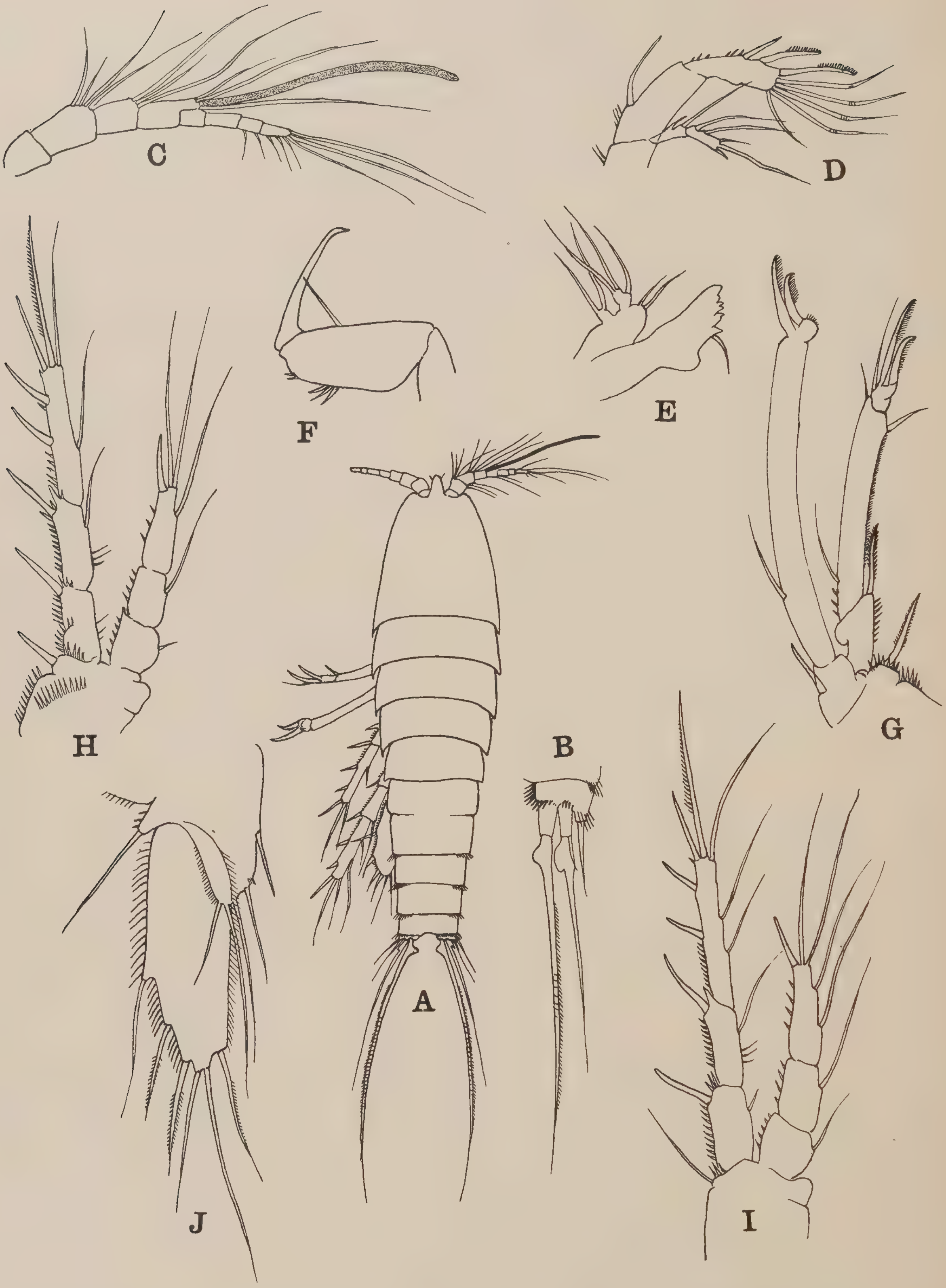
DESCRIPTIVE NOTES.—♀. Total length, 0·60 mm. The proportional lengths of the anterior and posterior regions of the body (Text-fig. 27, A) are as 52 to 48. The proportional lengths of the segments of the posterior region are as follows:

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
16	37	18	16	10	3 = 100

Abdominal segments 2, 3 and 4 are armed on their lateral aspects with a row of spines that runs parallel to the posterior margin but is interrupted in the mid-dorsal region. The furcal rami (Text-fig. 27, B) are very short and broad, and there is a row of spines along the margin of the 5th abdominal segment that borders the articulation of the furcal ramus. The basal parts of the 2nd and 3rd furcal setæ are markedly swollen in most instances, though in certain examples the swelling on the 3rd seta is not well developed.

In the 1st antenna (Text-fig. 27, C) there are only eight segments instead of the usual nine. The proportional lengths of the segments are as follows:

Segment 1.	2.	3.	4.	5.	6.	7.	8.
14	19	16	13	10	12	7	9 = 100



TEXT-FIG. 27.—*Parastenhelia littoralis* (Sars), f. *penicillata* Willey. A, Female, dorsal view. B, Furcal ramus. C, 1st antenna. D, 2nd antenna. E, Mandible. F, Maxilliped. G, 1st leg. H, 2nd leg. I, 3rd leg. J, 5th leg.

In the 2nd antenna (Text-fig. 27, D) the terminal segment of the endopod bears three spines, of which the 2nd and 3rd are fringed or penicillate, and four geniculate setæ.

The mouth-parts and swimming-legs for the most part agree with those of *P. littoralis*; but the terminal segment of the endopod of the 4th leg bears one more seta on its inner margin, thus having the setal formula 2, 2, 1, as in the 3rd leg, instead of 1, 2, 1 as is the case in *P. littoralis* and *P. forficula*.

In the 5th leg (Text-fig. 27, J) the free distal segment is long and bears six setæ, as in *P. littoralis*; the proximal segment is produced in a comparatively narrow flap bearing five setæ, of which the 5th or innermost is the smallest.

In the fresh state the colour of these examples was a pale blue-green.

DISTRIBUTION.—There can be no doubt that these examples agree with those recorded from Bermuda by Willey (*loc. cit. supra*) under the name *Microthalestris littoralis* f. *penicillata*.

Parastenhelia littoralis, f. *scotti* nom. nov. (Text-fig. 28, A–E.)

Thalestris forficula, T. Scott, 1894, p. 100, pl. xii, figs. 33–41.

OCCURRENCE.—In Addu Atoll, Maldive Archipelago, in weed-washings; a single female.

DESCRIPTIVE NOTES.—♀. Total length, 0·56 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 28, A) are as 56 to 44. The combined length of the fused cephalon and 1st thoracic segment is approximately equal to that of the next three segments. There is but little difference in the breadth of the two regions of the body.

The proportional lengths of the segments of the posterior region are as follows:

Segment Th. 5	Abd. 1–2.	3.	4.	5.	Furca.
17	39	15	13	13	3 = 100

The abdominal segments are fringed along their posterior margins with a row of fine needle-like spines. The furcal rami are four and a half times as broad as long. The inner furcal seta is at least twice as long as the next and is dilated in a pyriform swelling at its base, exactly as figured by T. Scott (*loc. cit.*, pl. xii, fig. 41), and also as shown by Claus (1863, pl. xvii, fig. 8) for the form that he described under the name *Thalestris forficula*.

The 1st antenna (Text-fig. 28, B) consists of only eight segments, as in the preceding form; these have the following proportional lengths:

Segment 1.	2.	3.	4.	5.	6.	7.	8.
14	18	16	15	11	11	7	8 = 100

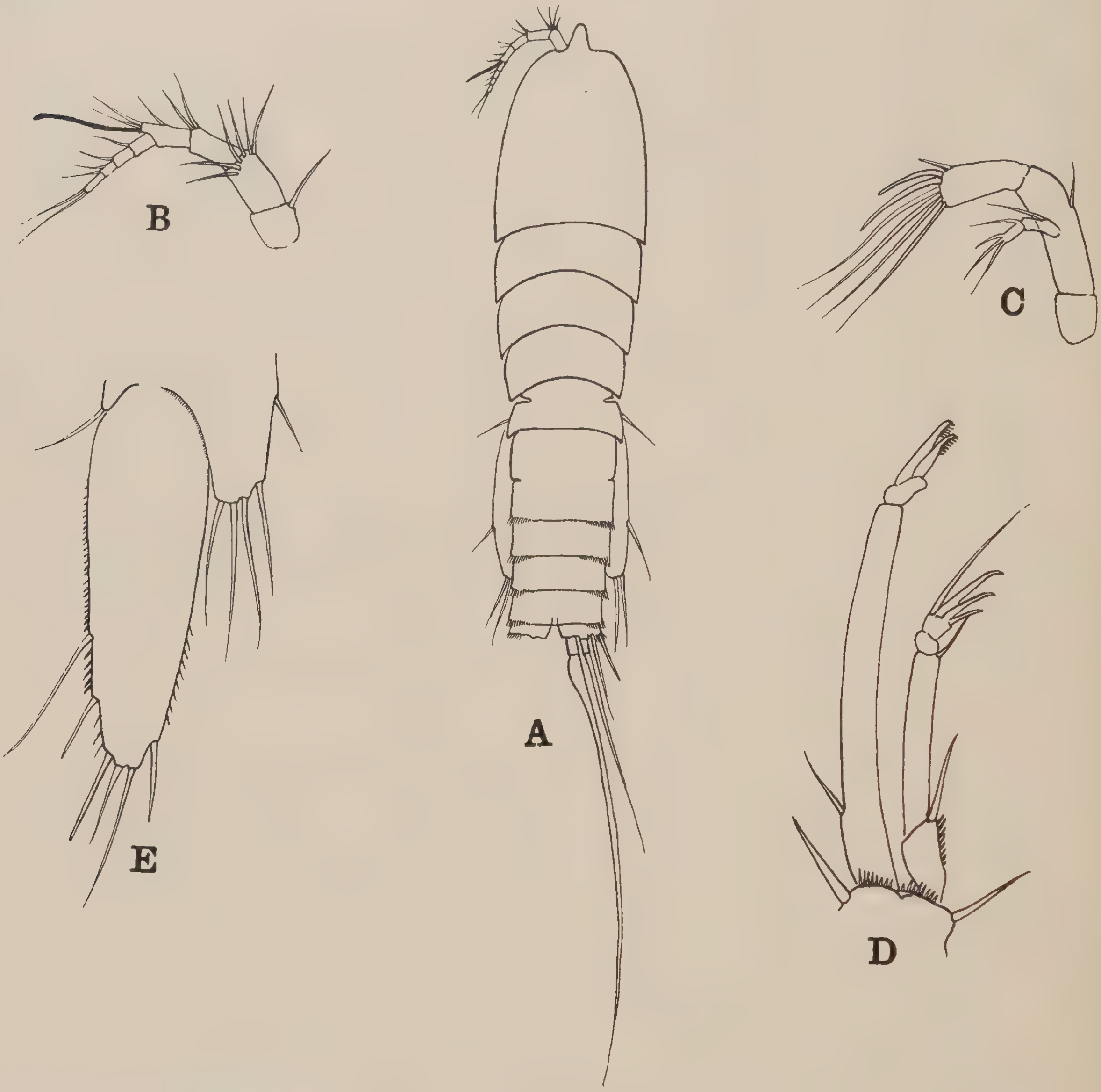
The 2nd antenna (Text-fig. 28, C) is composed of three segments, of which the 2nd is the longest. The distal segment bears three spines and four geniculate setæ, but the penicillate fringes on the 2nd and 3rd spines are very much less developed than in *P. littoralis* and in f. *penicillata*. The exopod consists of only two segments.

The 1st leg (Text-fig. 28, D) is of the usual type, but the exopod only reaches as far as the junction of the middle and distal thirds of the 1st segment of the endopod.

The swimming-legs appear to resemble those of *P. littoralis*.

The 5th leg (Text-fig. 28, E) is very elongate, the distal segment reaching back to the middle of the 4th segment of the abdomen. The free segment is decidedly widest at about one-fourth of its length from the proximal end, and it tapers gradually to the distal end, exactly as figured by T. Scott (*loc. cit.*, pl. xii, fig. 40); it bears six setæ. The basal segment is narrow and bears five setæ; T. Scott figures only four, but he appears to have overlooked the 5th, that arises from the inner margin at some little distance from the others.

Distribution.—The Maldive Archipelago (present record) and the Gulf of Guinea (T. Scott).



Text-fig. 28.—*Parastenhelia littoralis*, f. *scotti* nom. nov. A, Female, dorsal view. B, 1st antenna. C, 2nd antenna. D, 1st leg. E, 5th leg.

Genus *Xouthous* Thomson (= *Megarthrum* Norman and T. Scott).

Xouthous, Thomson, 1883, p. 103.
Megarthrum, Norman and T. Scott, 1906, p. 174.

This genus was erected by Thomson to accommodate a species that he obtained on the coast of New Zealand, and named *Xouthous novæ-zealandiæ*. Norman and Scott created the genus *Megarthrum* to accommodate a species that they had described in 1905 under the name *Dactylopusia purpurocincta*, and in this genus included two other species, *Dactylopusia laticaudata* and *D. æmula*, that had been recorded by Thompson and A. Scott (1903) from the Ceylon Pearl Banks. Sars (1903–11, p. 134), in his account of the genus *Idomene* Philippi, claimed that these two last species seemed to belong to Philippi's genus. Brady (1910) described a fifth species of *Megarthrum* from the " Valdivia " Collection under the name *M. simulans*.

As Monard (1928, p. 156 *et seq.*) has pointed out in his key to the Thalestridæ, the genera *Xouthous* (or *Megarthrum*) and *Idomene* are separated by the character of the endopod of the 1st leg, which in the former consists of only two segments, whereas in the latter it possesses three; Monard also remarks that the two genera *Xouthous* and *Megarthrum* cannot be distinguished from one another, and therefore the earlier name *Xouthous* has priority and *Megarthrum* must be relegated to the synonymy list.

Xouthous purpurocinctum (Norman and T. Scott). (Text-fig. 29, A–I.)

Megarthrum purpurocinctum, Norman and T. Scott, 1906, p. 175, pl. x, fig. 17; pl. xii, fig. 10; pl. xiv, fig. 9; pl. xviii, fig. 1; and pl. xx, figs. 4, 5.

Occurrence.—Off Burleigh Rock, Nankauri Island, Nicobars, in weed-washings; a single female.

Descriptive Notes.—♀. Total length, 0·38 mm. The example is thus considerably smaller than the specimens taken by Norman and T. Scott, which measured 0·5 mm. The body (Text-fig. 29, A) is crossed on the dorsal aspect of the 2nd, 3rd and a small part of the 4th thoracic segments by a broad band of purple colour; this band appears, however, to be slightly less broad than in the typical form.

The 1st antenna (Text-fig. 29, B) consists of seven segments.

The 2nd antenna (Text-fig. 29, C) possesses a two-jointed exopod.

The mandibular palp (Text-fig. 29, D) closely resembles the account of that structure given by Norman and T. Scott, and the lower branch of the palp bears the characteristic two strong spines.

The rest of the appendages (Text-fig. 29, E–I) agree closely with the description given by Norman and T. Scott, and such small differences as may be present fall within the limits of the amount of variation that one may well expect from individuals whose habitats lie so far apart.

Distribution.—The English Channel (Norman and T. Scott) and the Nicobar Islands.

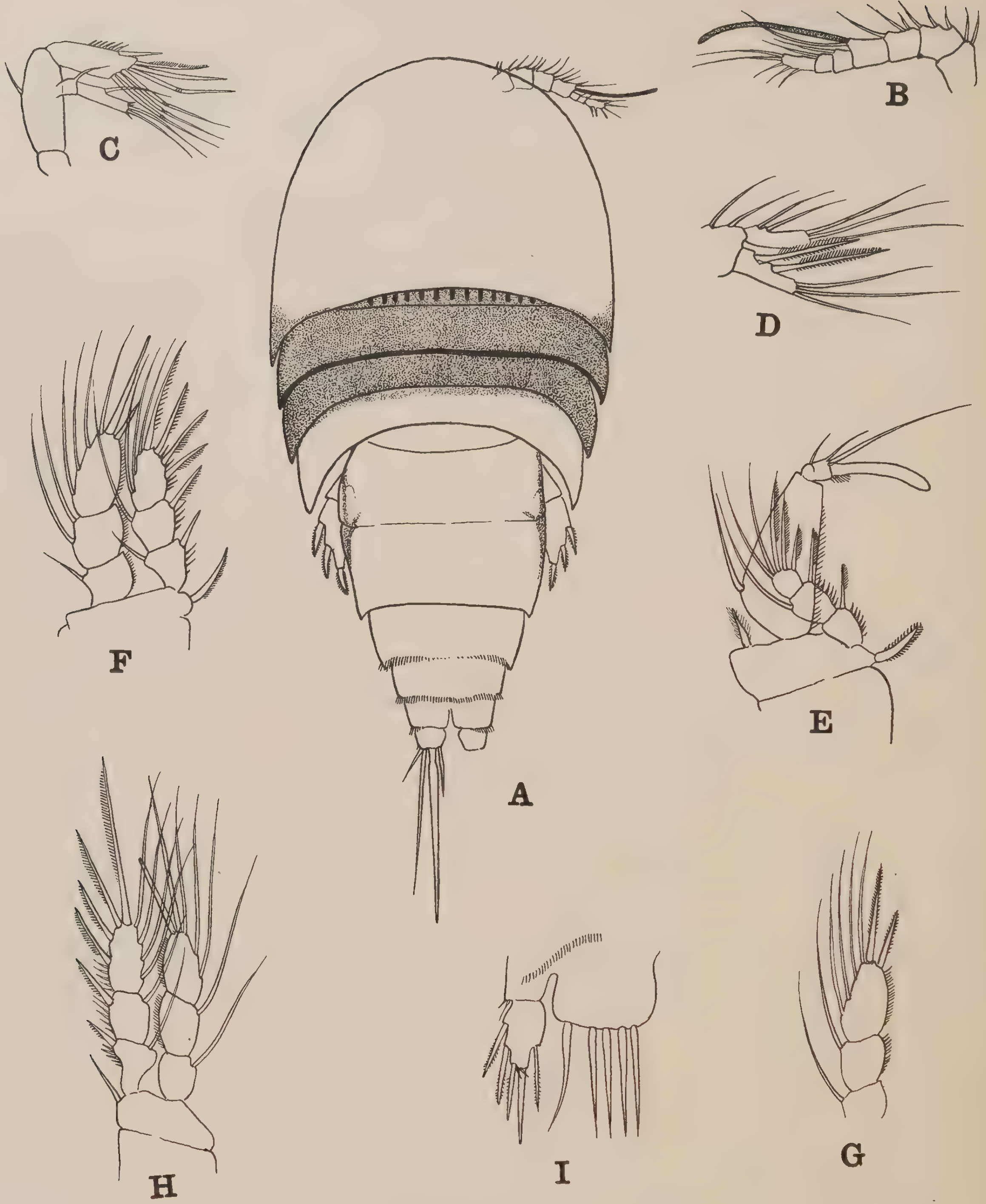
Xouthous laticaudata (Thompson and A. Scott).

Dactylopusia laticaudata, Thompson and A. Scott, 1903, p. 271, pl. xi, figs. 1–5.

Occurrence.—Addu Atoll, Maldive Archipelago, in weed washings; a single female.

Remarks.—Lang (1934, p. 26) has included this species in his list of those that belong to the genus *Idomene*, overlooking the fact that the character of the endopod of the 1st leg, which is composed of two segments only, separates it from that genus and puts it in the genus *Xouthous*.

Distribution.—The Ceylon Pearl Banks (Thompson and A. Scott) and the Maldive Archipelago.



Text-fig. 29.—*Xouthous purpurocinctum* (Norman and T. Scott). A, Female, dorsal view. B, 1st antenna. C, 2nd antenna. D, Mandibular palp. E, 1st leg. F, 2nd leg. G, Endopod of 3rd leg. H, 4th leg. I, 5th leg.

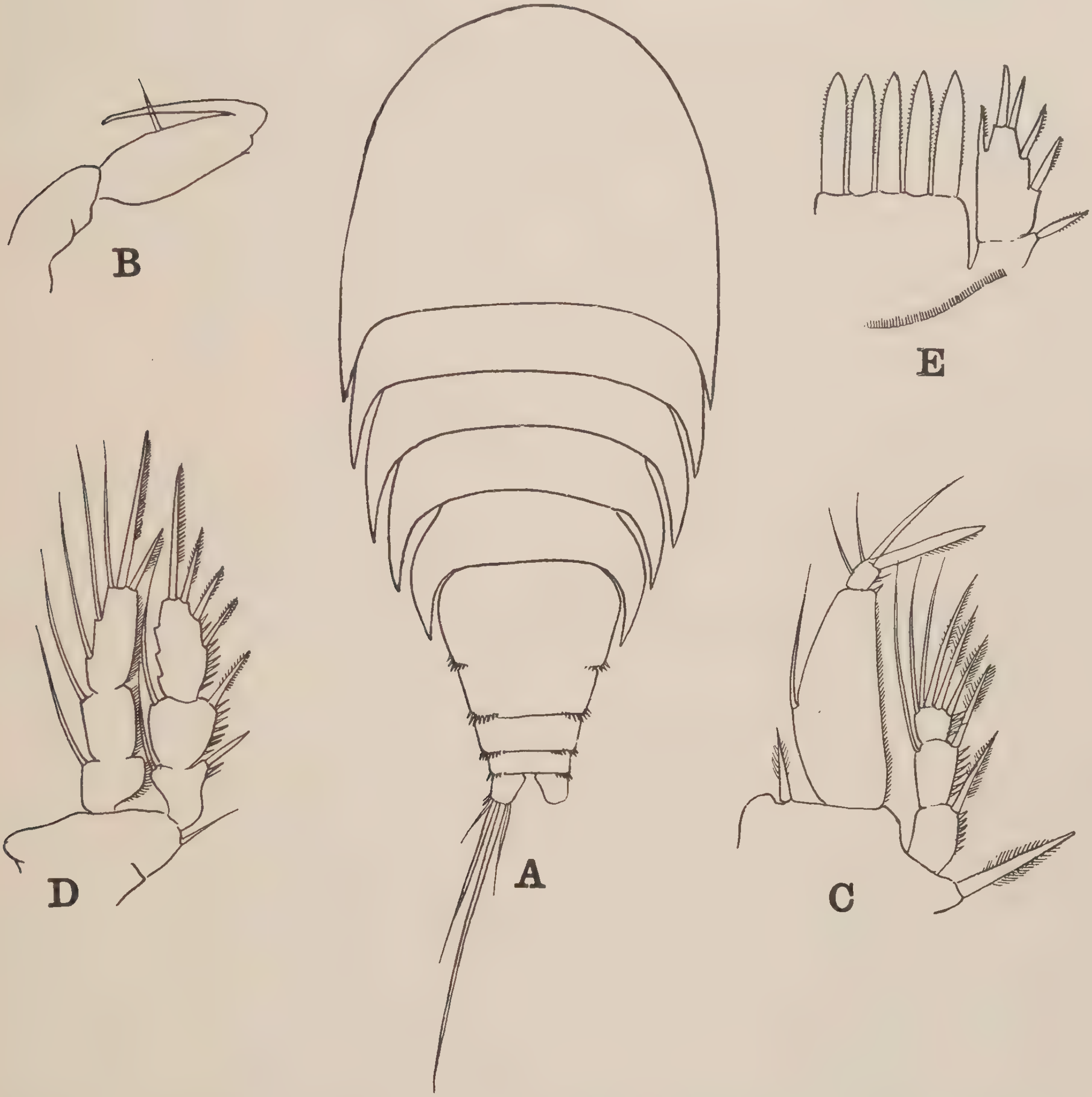
Xouthous maldiviæ sp. nov. (Text-fig. 30, A–E.)

Occurrence.—Addu Atoll, Maldive Archipelago, in weed-washings; one female.

Descriptive Notes.—♀. Total length, 0·62 mm. The proportional lengths of the anterior and posterior regions of the body are as 66 to 34. The general shape of the body

(Text-fig. 30, A) agrees closely with that of other members of the genus, being flattened ventrally and the anterior region being wide and rounded anteriorly, without a rostrum, while the posterior region is short and tapers markedly to the furca. The proportional lengths of the segments of the posterior region are as follows:

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
13	33	21	14	11	8 = 100



Text-fig. 30.—*Xouthous maldiviæ* sp. nov. A, Female, dorsal view. B, Maxilliped. C, 1st leg. D, 4th leg. E, 5th leg.

The posterior margins of the abdominal segments are fringed with rows of small spinules. The furcal rami are broader than long in the proportion of 10 to 6. The furcal setæ are short and simple.

The 1st antenna consists of only six segments.

The mouth-parts are as in *Xouthous purpurocinctum* (Norman and T. Scott), and the inner branch of the mandibular palp bears the usual two serrated spines.

The 1st leg (Text-fig. 30, C) has the form usual in this genus, the exopod being short and composed of three segments, while the endopod possesses only two segments, the proximal of which is much swollen, and the distal short and bearing a large serrated spine at its distal outer angle.

In the 2nd–4th legs (Text-fig. 30, D) inclusive the terminal segment of the endopod bears two unequal spines, instead of two setæ, at the distal end.

The 5th legs (Text-fig. 30, E) somewhat resemble those of *X. laticaudata* (Thompson and A. Scott) and *X. æmula* (Thompson and A. Scott) in that the fixed basal segment is crowned with a row of six flat spines, forming a palisade. The distal segment in its general shape closely resembles that of *X. laticaudata*, bearing one spine on the inner border, two distally and two on the outer border; but whereas in both *X. laticaudata* and *X. æmula* this segment does not extend beyond the distal margin of the basal segment, in the present form the margin of the basal segment lies at a level that is less than half the length of the distal free segment, as in *X. purpurocinctum*, but in this latter species the basal segment is fringed with six setæ and not with broad flat spines.

DISTRIBUTION.—At present known only from the Maldive Archipelago.

Genus *Eudactylopus* A. Scott.

Eudactylopus, A. Scott, 1909, p. 219.
Plesiothalestris, Brian, 1928, p. 2.

This genus was created by A. Scott (1909) in his report on the "Siboga" collection in order to accommodate a species that had been recorded by T. Scott from the Gulf of Guinea under the name *Dactylopus latipes*, and to this species and genus he referred certain examples from the Malay Archipelago. The characters of the genus, as given by him, are as follows:

"The body is moderately stout in front and rather slender behind. The anterior division is more or less depressed. The cephalic segment is provided with a well-developed and very motile rostrum. The abdomen of the female is composed of four segments. The antennules are short, stout and seven-jointed. The exopodite of the antennæ is two-jointed. The mandibles, maxillæ and maxillipeds are normal and are similar to those of the genus *Dactylopusia* Norman. The exopodite of the first pair of feet is three-jointed and is considerably shorter than the endopodite. The terminal joint is short and armed with claws. The endopodite is two-jointed or very indistinctly three-jointed. The 1st joint is long. The 2nd joint is very short and is armed with a very powerful claw. The exopodite and endopodite of the 2nd, 3rd and 4th pairs of feet are three-jointed and are similar to *Dactylopusia*. The 5th pair of feet are large, foliaceous and transparent and completely cover the ovisac below." As the type of this new genus Scott cites *Dactylopus latipes* T. Scott (1893). Unfortunately A. Scott appears to have overlooked a difference in the structure of the 1st antenna in the two forms, for T. Scott clearly states that in his examples the 1st antenna is definitely composed of nine segments, whereas A. Scott's form possessed an antenna composed of only seven, the terminal portion comprising only three segments instead of five.

Monard (1928, p. 356) later redefined this genus as follows: "Corps renflé en avant, atténué en arrière. Furca courte, avec les soies bien développées. Rostre bien délimité à la base. AI à 9 articles, plutôt courte. AII à 2 articles, l'exp. à 1 ou 2 articles. Palpe mand. à 1 lobe seulement. Palpe max. à lobes bien conformés. MpII à main ovale, ciliée. End. de PI à 2 articles, le premier long, le deuxième court, armé de crochets. Toutes les autres rames triarticulées. Médians des end. II–IV porteur de 2, 2, 1 soies, ce qui place le genre près de *Rhynchothalestris* et *Thalestris*. PV énorme, foliacée, rappelant celle de *Phyllothalestris*, à 2 articles se recouvrant partiellement et à soies courtes."

As thus defined, the genus conforms with the description given by T. Scott of the examples taken by him in the Gulf of Guinea, but differs from that of A. Scott of the examples from the Malay Archipelago. To this genus Monard has added a second species, *Eudactylopus spectabilis* Brian, in which the exopod of the 2nd antenna is composed of only a single segment, and in which the setal formula of the swimming-legs is as follows :

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P2	1	2	2, 2, 1	1	1	2, 2, 3
P3	1	2	3, 2, 1	1	1	3, 2, 3
P4	1	1	2, 2, 1	1	1	3, 2, 3

It thus becomes necessary to amend the definition of the genus as follows : "The 1st antenna is composed of seven or nine segments," and thus combine the two definitions as given by A. Scott and Monard respectively.

In the same year Brian (1928, p. 2) created a new genus, *Plesiothalestris*, to accommodate a species that he obtained in the Ægean region of the Mediterranean Sea.

I am, however, unable to discover any feature that will differentiate between these two genera, and Brian's genus *Plesiothalestris* must be relegated to the synonymy of *Eudactylopus*.

Eudactylopus latipes T. Scott.

Dactylopusia latipes, T. Scott, 1893, p. 99, pl. x, figs. 38–43.

This species was obtained by T. Scott in the Gulf of Guinea, and in his description he clearly states that the 1st antenna consists of nine segments. Subsequently, A. Scott (1909, p. 217, pl. lxiii, figs. 8–14) obtained, in the "Siboga" collections, a form that he regarded as belonging to the same species, but in which the 1st antenna consists of only seven segments. In all other respects the two forms appear to be identical. The possession of only seven segments in the 1st antenna of the female is a character that, as we shall see, is characteristic of the 5th Copepodid stage, and in the males of the form that were taken by the "Investigator" the 5th pair of legs in the adult also exhibit characters that, in other members of the genus, are associated with the 5th Copepodid stage, namely the incomplete separation of the free segment of the appendage.

It thus appears probable that whereas the form obtained by T. Scott in the Atlantic Ocean undergoes a normal development, in the form that occurs in the Indo-Pacific region the attainment of sexual maturity in both sexes is accompanied by the retention of certain immature characters. I therefore propose for the Atlantic form obtained by T. Scott the name f. *typica*, and for the Indo-Pacific form the name f. *andrewi*.

f. *andrewi.* (Text-fig. 31, A–I, ♀; Text-fig. 32, A–E, ♂; Text-fig. 33, A–I, ♀, juv.)

Eudactylopus latipes, A. Scott, 1909, p. 217, pl. lxiii, figs. 8–14.

Occurrence.—Nankauri Harbour, Nicobar Islands, in weed-washings; examples of both sexes and some immature females. Addu Atoll, Maldive Archipelago, in weed; both sexes.

Descriptive Notes.—♀. Total length, 1·28 mm. The proportional lengths of the anterior and posterior regions of the body (Text-fig. 31, A) are as 48 to 52. The segments of the posterior region have the following proportional lengths:

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
10	37	17	17	10	9 = 100

The rostrum is well defined and is sharply pointed at its free end. The posterior margins and sides of the abdominal segments are fringed with small spinules, and the last three thoracic segments also bear scattered spinules laterally. The furcal rami are longer than broad and are slightly divergent. The 2nd furcal seta is much longer than the others and equals the abdomen in length. The outer distal angle of the ramus bears a seta and not a spine.

The 1st antenna (Text-fig. 31, B) reaches back nearly to half the length of the cephalosome; it is composed of only seven segments, of which the proximal four are much stouter than the distal three. The proportional lengths of the segments are as follows:

Segment 1.	2.	3.	4.	5.	6.	7.
31	15	13	12	7	7	15 = 100

The proximal segment bears a row of spinules on its anterior margin and a tuft of spinules at the distal anterior angle. The 4th segment bears the usual long sensory filament.

The 2nd antenna (Text-fig. 31, C) bears on the distal segment four spines, that increase in length distally; and these are followed by two geniculate setæ, a straight needle-like spine and a delicate seta. The exopod consists of two segments, the distal being quite short.

The mandible (Text-fig. 31, D) is provided with a very stout, biting ramus, armed with powerful teeth, and the palp consists of a basal segment, bearing two very unequal unjointed rami; the outer ramus is very small and bears two setæ.

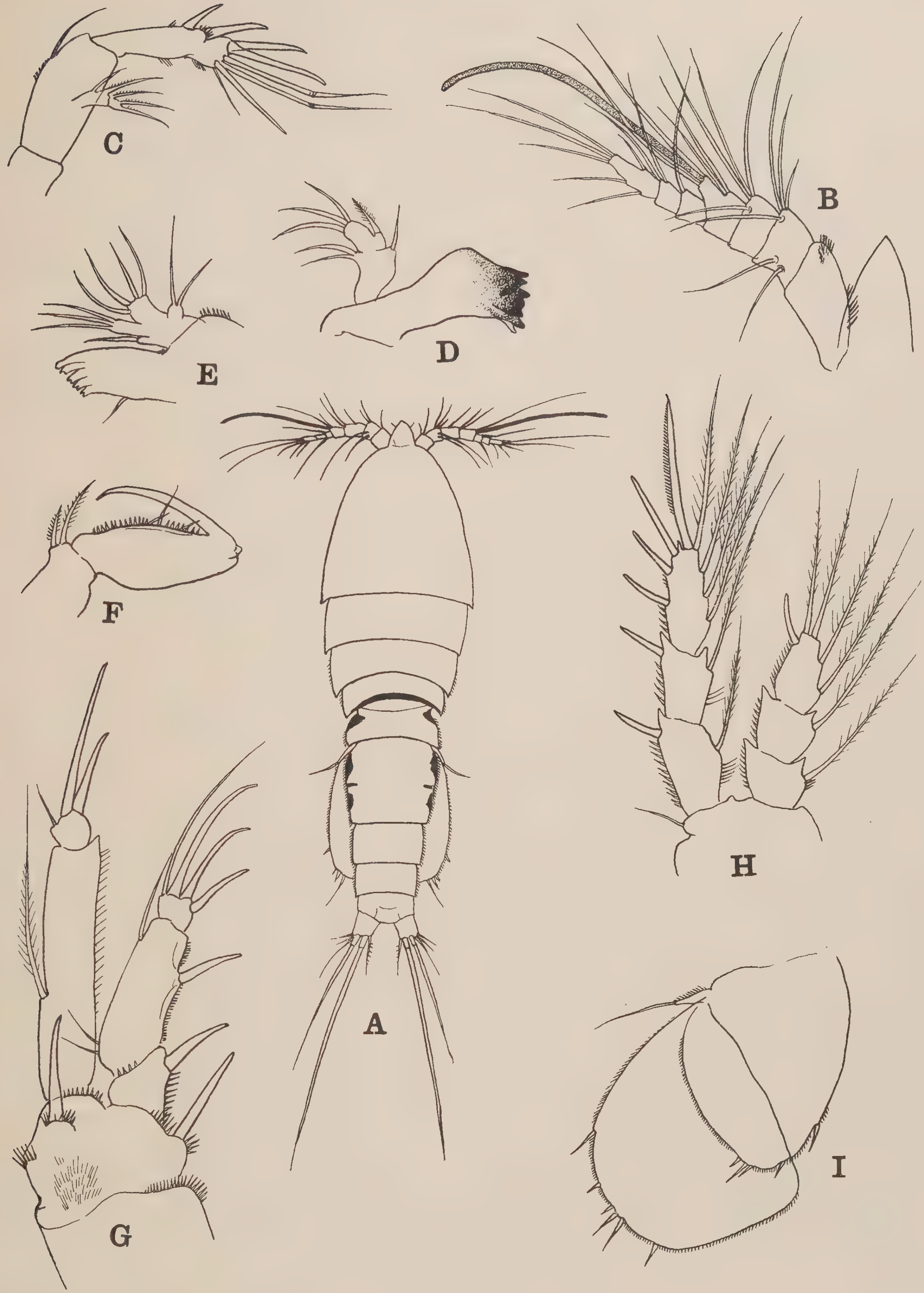
The 1st maxilla (Text-fig. 31, E) resembles that of species of the genus *Dactylopusia*.

In the 2nd maxilla the 1st lobe bears two setæ, the 2nd and 3rd lobes each bear a single spine; the 4th lobe bears two serrated spines, and the 5th lobe bears a strong serrated spine and two setæ.

The maxilliped (Text-fig. 31, F) forms a powerful grasping claw, the anterior margin of the "hand" being fringed with a row of spinules.

The 1st leg (Text-fig. 31, G) consists of a three-jointed exopod and a two-jointed endopod. Basal 1 is fringed with spinules at its distal outer angle. From basal 2 a stout spine arises from both the inner and outer border, while the margin of the articulation with both the endopod and exopod, the base of both the inner and outer spines and the inner margin about the middle of its length are fringed with needle-like spinules; a patch of fine needle-like spines is situated on the surface of the segment.

In the 2nd and 3rd legs the rami are both three-jointed, and the 2nd segment of the endopod bears two setæ.



TEXT-FIG. 31.—*Eudactylopus latipes* (T. Scott), f. *andrewi*, ♀. A, Female, dorsal view. B, 1st antenna. C, 2nd antenna. D, Mandible. E, 1st maxilla. F, Maxilliped. G, 1st leg. H, 4th leg. I, 5th leg.

In the 4th leg (Text-fig. 31, H) the 2nd segment of the endopod, as a rule, bears only a single seta, but I have dissected a specimen in which two setæ arose from this segment, as in the 2nd and 3rd legs.

The 5th leg (Text-fig. 31, I) is composed of two wide flaps, that reach back to about the middle of the 4th abdominal segment. The outer free flap is considerably the larger and is sub-triangular in outline, while the inner flap is oval. Each flap bears a few short setæ on the distal margin, five on the inner flap and six on the outer, and the margins are fringed with short spinules.

The body is uniformly coloured a pale greenish-yellow, with no markings except small purple patches on the lateral margins of the 5th thoracic and 1st abdominal segments.

♂. Total length, 0·9 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 32, A) are as 48 to 52. The present specimens agree closely with the descriptions and figures given by A. Scott (*loc. cit.*). The abdomen possesses five segments, of which the 1st and 2nd are fringed along their posterior margins with fine spinules, while other spinules are scattered on the lateral aspects of segments 3, 4 and 5. The furcal rami are about as long as broad and are slightly divergent. The 2nd furcal seta is by far the longest, and is about twice the length of the 3rd, and equal in length to the whole abdomen.

The 1st antenna (Text-fig. 32, B) forms a grasping organ and is composed of seven segments, of which the 3rd and 4th each bear a long sensory filament.

The endopod of the 2nd leg (Text-fig. 32, C) is, as usual, modified, and is composed of only two free segments, the 2nd and 3rd being fused. From the inner margin of the combined 2nd and 3rd segments arise four setæ, the proximal two being reduced in size. The distal end of the joint terminates in a cone-like process bearing a small straight seta. The inner margin near the distal end is markedly notched and from the floor of this notch arise two modified setæ, the inner being setiform and bent near the base at an angle, while the outer is thickened and tapers to a minutely bifid extremity.

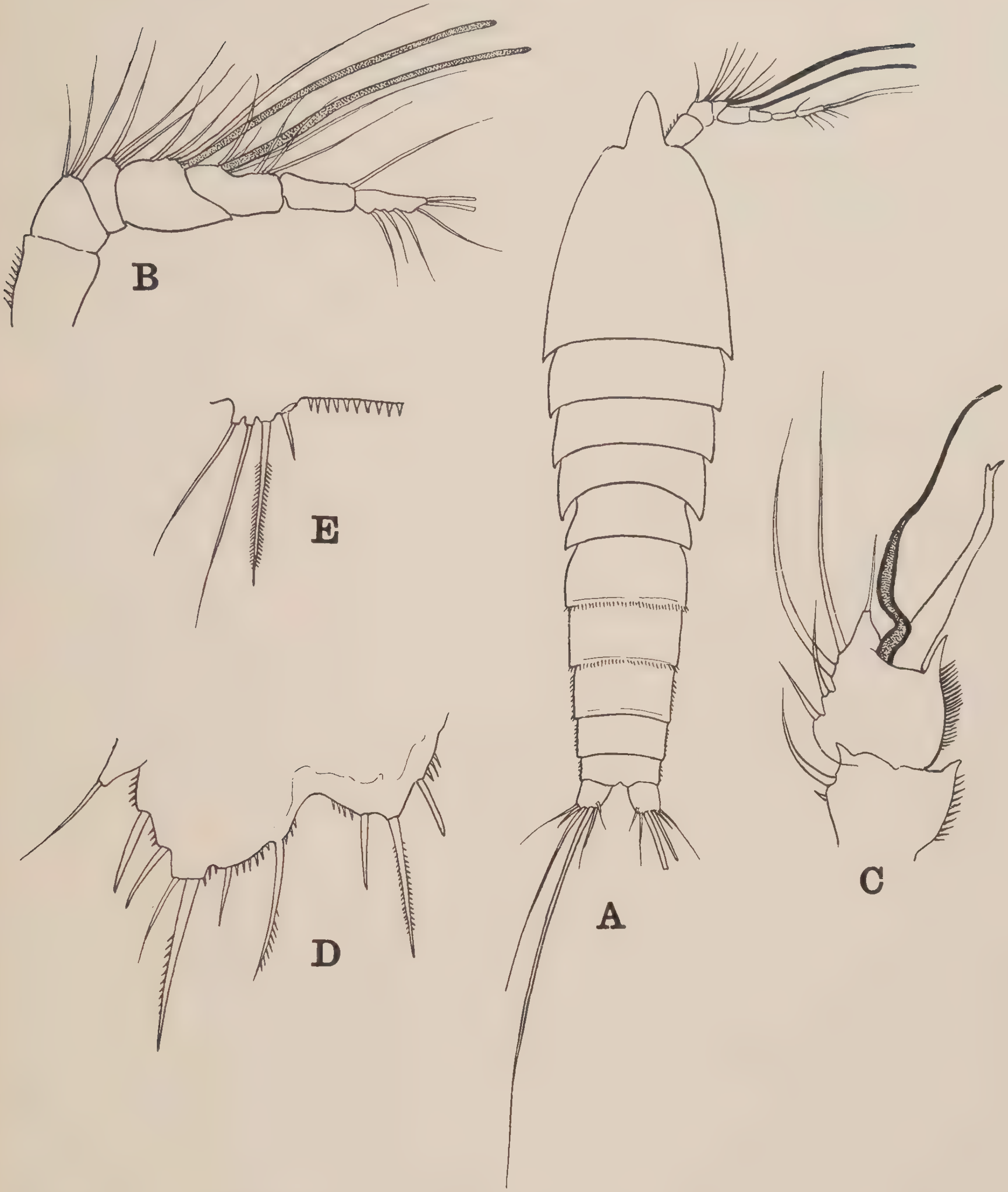
The 5th pair of legs (Text-fig. 32, D) are not fully developed and exhibit the characteristics of this appendage in the 5th copepodid stage. Each limb is composed of two projections, of which the outer is triangular and bears six setæ; of these, two subequal spine-like setæ arise from the outer margin, a small seta and a long serrated spine spring from the distal extremity, and two unequal spine-like setæ arise from the inner border. The inner and smaller triangular projection bears three spine-like setæ, of which the middle is much the longest. The margins of both flaps are armed with small spinules.

The genital segment (Text-fig. 32, E) is produced on each side in a low prominence, bearing externally two setæ and externally two unequal spines, the outer much the larger and serrated. Between the two prominences the margin is fringed with a row of triangular spinules.

Copepodid stage V.—♀. Total length, 1·04 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 33, A) are as 47 to 53. The rostrum is large and appears to be minutely bifid at its free extremity. The segments of the posterior region of the body have the following proportional lengths:

Segment Th. 5.	Abd. 1.	2.	3.	4–5.	Furca.
16	21	17	17	20	9 = 100



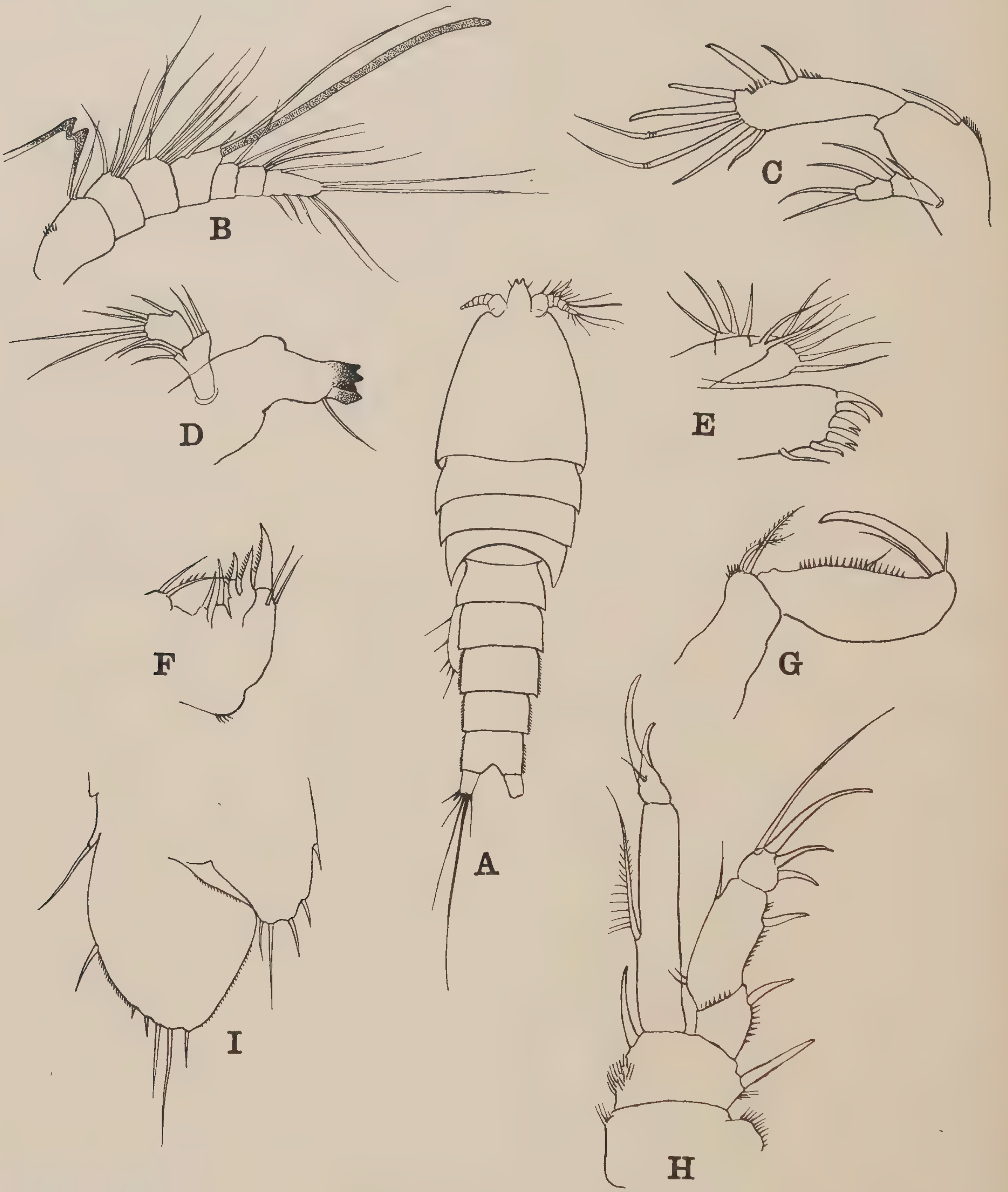
TEXT-FIG. 32.—*Eudactylopus latipes* (T. Scott), f. *andrewi*, ♂. A, Male, dorsal view. B, 1st antenna. C, Endopod of 2nd leg. D, 5th leg. E, Genital armature.

The posterior margins and sides of the abdominal segments are fringed with spinules.

The 1st antenna (Text-fig. 33, B) consists of seven segments, having the following proportional lengths :

Segment	1.	2.	3.	4.	5.	6.	7.
	34	11	14	11	7	6	17 = 100

There is thus little or no change in this appendage at the last moult. The four proximal segments are considerably stouter than the distal three, and the 4th bears the usual sensory filament.



Text-fig. 33.—*Eudactylopus latipes* (T. Scott), f. *andrewi*, juv. Stage V. A, Immature female, dorsal view. B, Rostrum and 1st antenna. C, 2nd antenna. D, Mandible. E, 1st maxilla. F, 2nd maxilla. G, Maxilliped. H, 1st leg. I, 5th leg.

The 2nd antenna (Text-fig. 33, C) and mouth-parts closely resemble those of the adult, but in the mandible (Text-fig. 33, D) the biting ramus appears to bear only two stout teeth, whereas there are three in the adult stage.

The swimming-legs agree with those of the adult.

The 5th leg (Text-fig. 33, I) is not yet fully differentiated, and the two flaps are fused together and to the segment at their bases, though their shape clearly foreshadows the adult condition.

Distribution.—Up to the present time this species has been recorded from the Malay Archipelago (A. Scott), the Nicobar Islands, the Ceylon Pearl Banks (Thompson and A. Scott), the Maldive Archipelago, and the Gulf of Guinea (T. Scott).

Eudactylopus opima (Brian).

Plesiothalestris opima, Brian, 1928*a*, p. 2, figs. 1–12; *id.*, 1928*b*, p. 315, fig. 16.

Occurrence.—Nankauri Harbour and East Coast of Camorta Island, Nicobar Islands, and Addu Atoll, Maldive Archipelago, in weed-washings; several examples of both sexes.

Descriptive Notes.—The examples of this species that were obtained in the above localities fall into two definite size groups, in each of which examples of both males and females were sexually mature. Associated with these mature specimens were a few immature forms.

forma *major*. (Text-fig. 34, A–G).

♀. Total length, 1·65–1·76 mm. These examples are somewhat larger than the specimens taken by Brian in the Ægean Sea, which measured 1·35–1·4 mm. in length.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 34, A) are as 48 to 52. The proportional lengths of the segments of the posterior region are as follows:

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
12	35	19	15	7	12 = 100

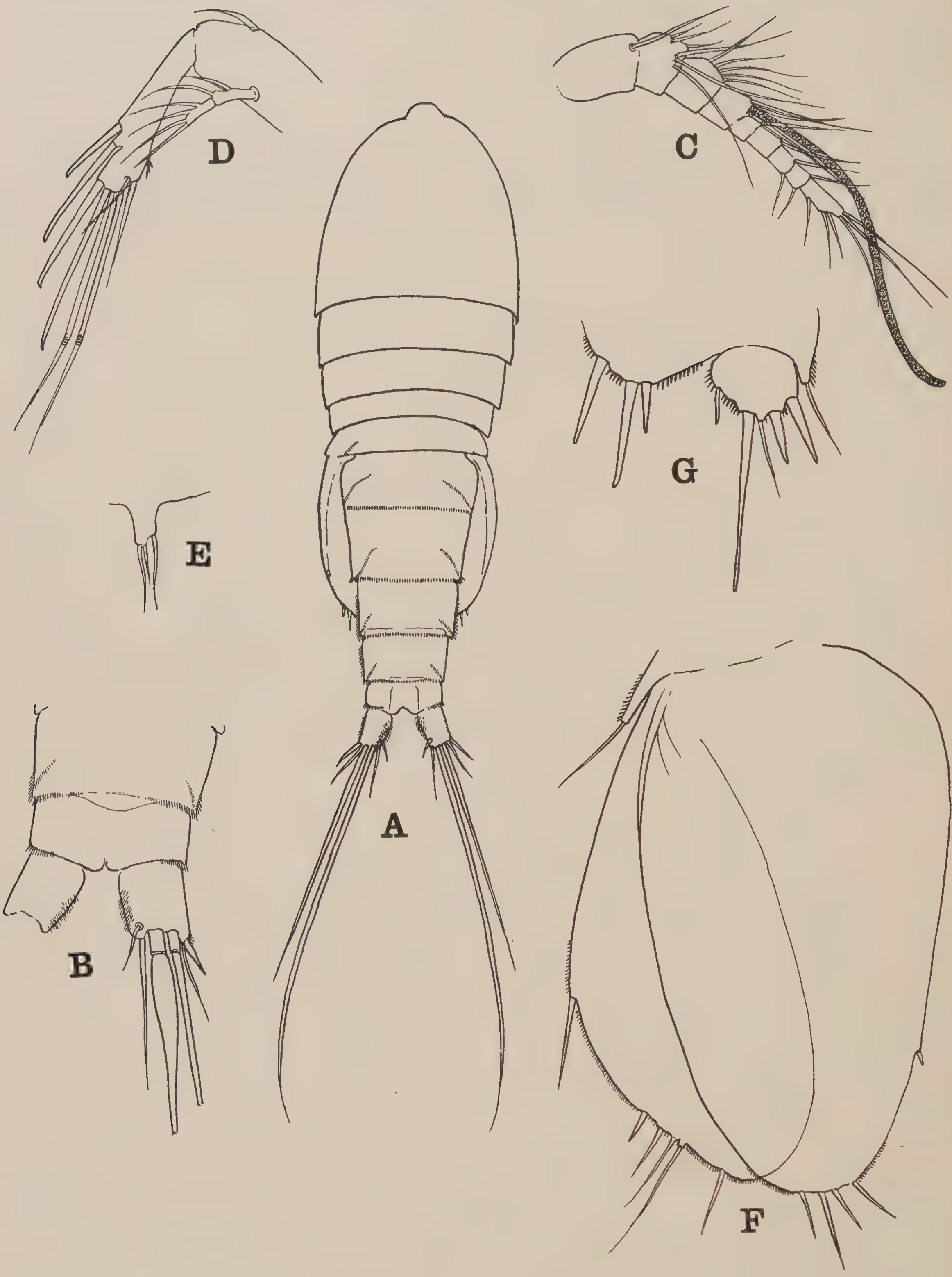
The posterior margins of all the abdominal segments are fringed with fine spinules, and a row of similar spinules runs forwards and upwards on the dorso-lateral aspects of segments 1 to 4 inclusive. The furcal rami (Text-fig. 34, B) are longer than broad, and are fringed with fine spinules along the lateral aspect, while the inner surfaces are fringed with short hairs. The 2nd furcal seta is the stoutest, and exceeds the length of the posterior region and the 4th thoracic segment together; it is somewhat swollen at the base.

The 1st antenna (Text-fig. 34, C) consists of nine segments that have the following proportional lengths:

Segment 1.	2.	3.	4.	5.	6.	7.	8.	9.
26	13	13	10	8	8	6	6	10 = 100

The first four segments are comparatively stout, while the distal five are more slender. The 1st segment bears a row of fine spinules along its anterior margin, and the 4th segment bears the usual long sensory filament.

In the 2nd antenna (Text-fig. 34, D) the exopod is composed of two segments, thus differing from Brian's specimens; but the line of demarcation between the two joints is not very clearly marked. As in Brian's specimens, the terminal segment of the endopod bears three spines on its anterior margin and on the distal end it carries a long slender



Text-fig. 34.—*Eudactylopus opima* (Brian), f. *major*. A, Female, dorsal view. B, Anal segment and furcal rami. C, 1st antenna. D, 2nd antenna. E, Genital armature, male. F, 5th leg, female. G, 5th leg, male.

spine, then two geniculate setæ, and below these another rather stouter spine, followed by a delicate simple seta.

The mouth-parts and the first four pairs of legs agree exactly with Brian's specimens.

The 5th pair of legs (Text-fig. 34, F) agrees closely with Brian's description, but the outer foliaceous plate seems to reach a trifle further towards the end of the inner plate.

Dr. Brian, in his figure of the 4th swimming-leg (1928*a*, p. 3, fig. 9), shows the 2nd segment of the exopod as being devoid of an inner seta, and the terminal segment as bearing four setæ on its inner margin, and a seta and a spine at its distal end, but, as he has very kindly informed me in a personal letter, this is an error, and the distribution of the setæ agrees exactly with the formula given above for the genus. Dr. Brian was also kind enough to send me a specimen for examination, and I was unable to detect any difference between the Mediterranean and Indian examples.

♂. Total length, 1·162 mm. The length of Brian's specimens from the Ægean Sea was 1·125 mm.

The 5th leg (Text-fig. 34, G) in the present examples differs slightly from the Mediterranean form in the degree of development of the spines on the free segment.

The genital armature consists of three unequal setæ arising from a narrow prominence.

forma *minor*. (Text-fig. 35, A–L.)

♀. Total length, 0·899 mm. The proportional lengths of the anterior and posterior regions of the body are as 49 to 51. The proportional lengths of the segments of the posterior region are as follows:

Segment Th. 1.	Abd. 1–2.	3.	4.	5.	Furca.
9	34	18	16	9	14 = 100

The posterior margins and lateral aspects of the abdominal segments are fringed with rows of fine spinules, and there are scattered spinules on the lateral aspects of the thoracic segments. The furcal rami are longer than broad in the proportion of 57 to 43. The 2nd furcal seta is swollen at the base.

The 1st antenna consists of nine segments, having the following proportional lengths:

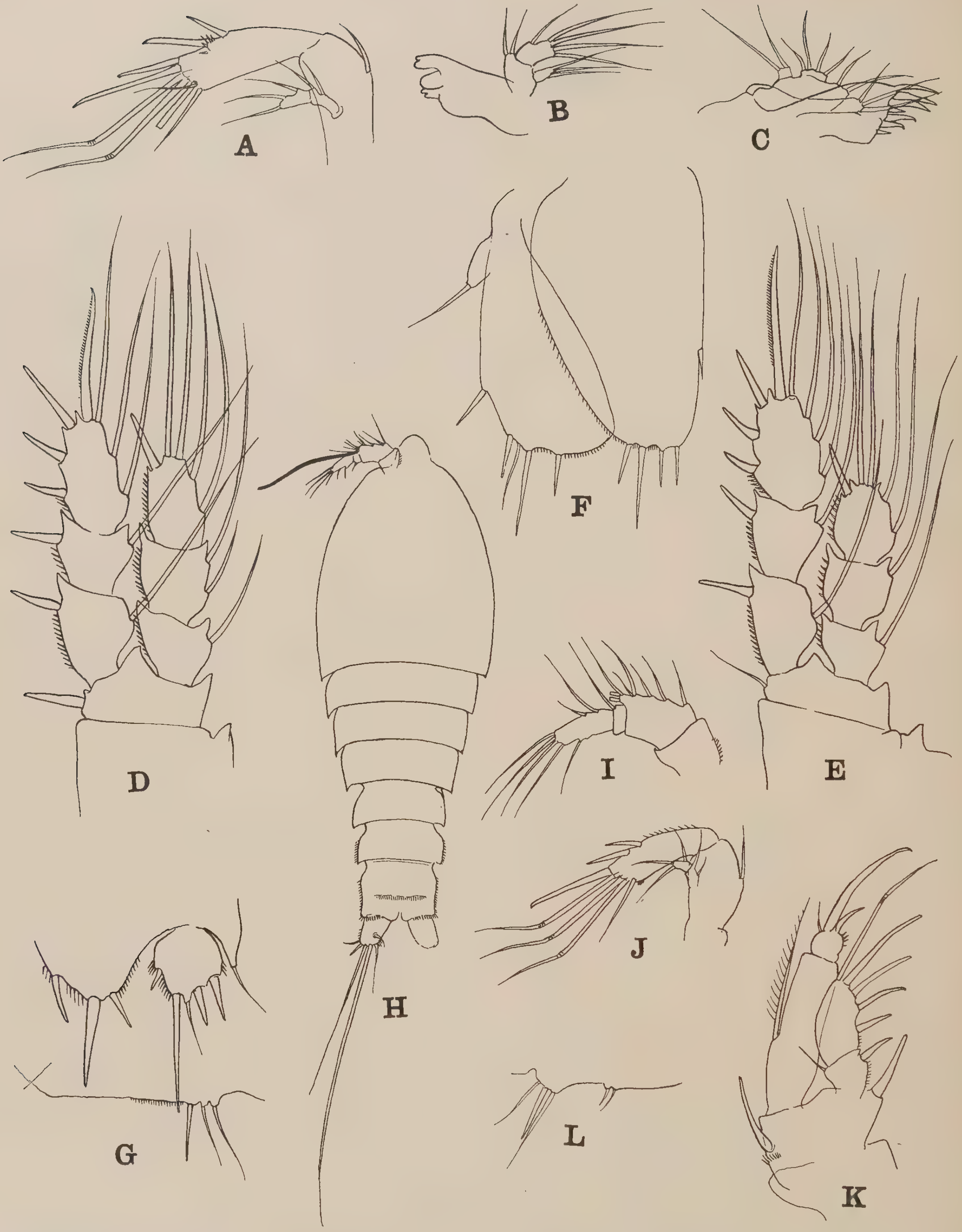
Segment 1.	2.	3.	4.	5.	6.	7.	8.	9.
29	11	13	11	8	8	5	4	11 = 100

The various appendages of the body appear to correspond closely with those of the larger form.

The 5th leg (Text-fig. 35, F) differs slightly and appears to be less clearly differentiated at the base; the outer plate is triangular in shape, instead of oval, being truncated at its apex, and it bears only five setæ and spines instead of six.

♂. Total length, 0·866 mm.

So far as I have been able to discover, this form agrees almost exactly with the larger form except for very slight differences in the 5th leg (Text-fig. 35, G). In this form the free segment is somewhat longer in proportion to its breadth and is thus more triangular and less oval in shape; in this respect it conforms more nearly to the shape of the free segment in the Mediterranean examples, but, as in the larger form, the spine that arises from the apex of the triangle is very much longer.



Text-fig. 35.—*Eudactylopus opima* (Brian), f. *minor* and Stage III. A, 2nd antenna. B, Mandible. C, 1st maxilla. D, 2nd leg. E, 4th leg. F, 5th leg, female. G, 5th leg and genital armature, male. H, Stage III, dorsal view. I, 1st antenna, Stage III. J, 2nd antenna, Stage III. K, 1st leg, Stage III. L, 5th leg, Stage III.

With these adults were a few examples of an immature stage.

Copepodid Stage III.—Total length, 0·628 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 35, H) are as 64 to 36. In this stage the abdomen is composed of only three segments, having, with the furca, the following proportional lengths :

Segment 1.	2.	3–5.	Furca.
24	28	30	18 = 100

The 1st antenna (Text-fig. 35, I) is composed of only four segments, having the following proportional lengths :

Segment 1.	2.	3.	4.
30	33	6	31 = 100

In the 2nd antenna (Text-fig. 35, J) the exopod, though small, is composed of two segments.

The 1st–3rd swimming-legs inclusive at this stage show only two segments in each ramus, the exopod being 2-jointed, owing to the separation of segments 2 and 3 not yet having taken place.

In the 4th leg the exopod resembles that of the anterior limbs and is composed of only two segments, segments 2 and 3 not yet being differentiated ; the endopod, however, is composed of a single segment.

The 5th leg (Text-fig. 35, L) is hardly differentiated ; on the posterior margin of the segment are two slight projections, the inner bearing two setæ, and the outer, which is somewhat more pronounced, three.

Brian describes the coloration of his fresh examples as being " rouge foncé " ; my examples, which had been preserved in formalin, were colourless.

DISTRIBUTION.—The Ægean Sea in the Mediterranean region (Brian), the Maldive Archipelago and the Nicobar Islands (present records).

Eudactylopus striatus sp. nov. (Text-fig. 36, A–J, ♂ ; Text-fig. 37, A–K, ♀, Stage V.)

OCCURRENCE.—Nankauri Harbour, Nicobar Islands, in weed-washings ; several males and immature females.

DESCRIPTIVE NOTES.—♂. Total length, 1·014 mm. The proportional lengths of the anterior and posterior regions of the body (Text-fig. 36, A) are almost exactly equal. The segments of the posterior region have the following proportional lengths :

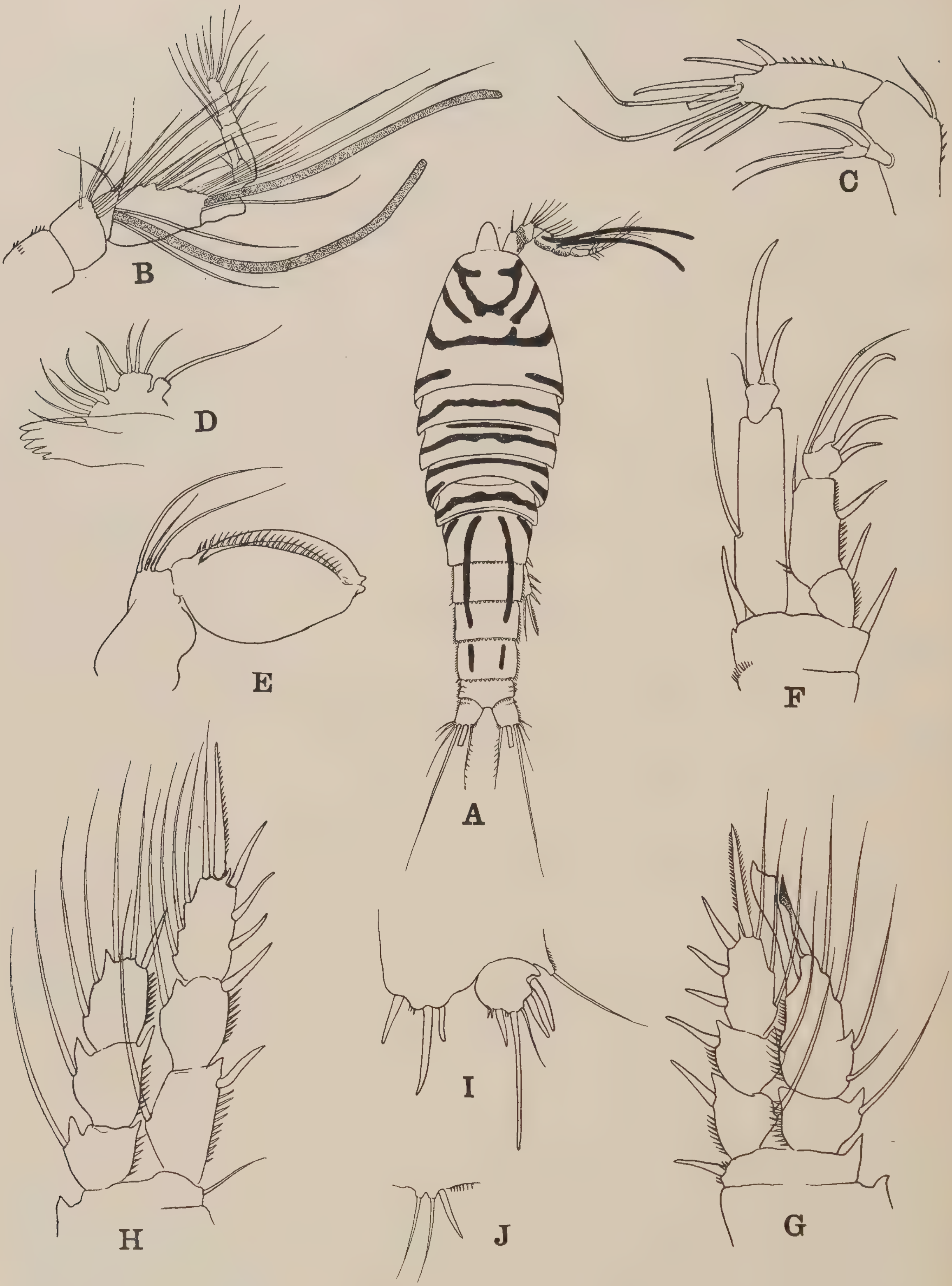
Segment Th. 5.	Abd. 1.	2.	3.	4.	5.	Furca.
10	17	17	17	17	10	12 = 100

The rostrum is well developed and is hinged to the cephalon.

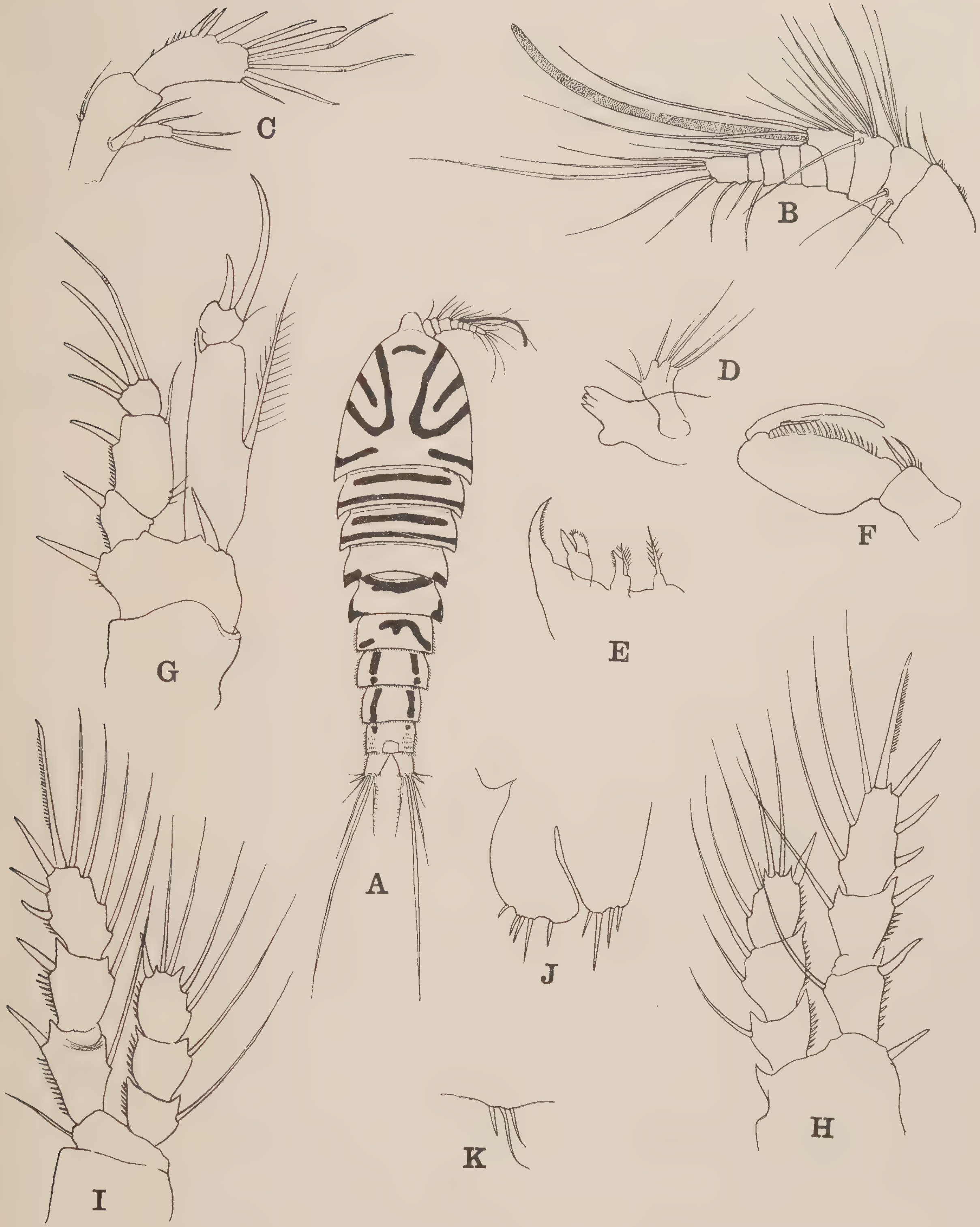
The 1st antenna (Text-fig. 36, B) is composed of nine segments and is modified to form a grasping organ, the hinge being situated between segments 5 and 6 ; the four proximal segments are inflated, and both the 3rd and 4th segments bear a long sensory seta. The whole appendage reaches back a little beyond half the length of the cephalosome.

The 2nd antenna (Text-fig. 36, C) resembles that of the preceding species, the exopod consisting of two segments and the terminal segment of the endopod showing the same two geniculate setæ, followed by a stout spine and a simple seta.

The mouth-parts (Text-fig. 36, D, E) and swimming-legs (Text-figs. F, G and H) agree



TEXT-FIG. 36.—*Eudactylopus striatus* sp. nov., ♂. A, Male, dorsal view. B, 1st antenna. C, 2nd antenna. D, 1st maxilla. E, Maxilliped. F, 1st leg. G, 2nd leg. H, 4th leg. I, 5th leg. J, Genital armature.



TEXT-FIG. 37.—*Eudactylopus striatus* sp. nov., ♀, Stage V. A, Dorsal view. B, 1st antenna C, 2nd antenna. D, Mandible. E, 2nd maxilla (part). F, Maxilliped. G, 1st leg. H, 2nd leg. I, 4th leg. J, 5th leg. K, Genital armature.

almost exactly with those of the preceding species; the endopod of the 2nd leg is modified and consists of only two segments, the 2nd and 3rd being fused together. The line of junction of the two joints can be recognized by the presence on the inner margin of a distally directed spinous projection, and on the outer margin by a break in and a change of character of the hairy fringe; the portion corresponding to segment 2 carries two setæ on its inner margin, the proximal one being small; from the distal end of the combined segment arise two spines, the outer club-shaped with a narrow stalk and a swollen extremity and the inner scalpelliform, and the inner border bears two setæ.

The 5th pair of legs (Text-fig. 36, I) agrees almost exactly with those of the preceding species.

Almost the only distinguishing character between this and the preceding species is to be found in the coloration, which in this form consists of a marked and handsome pattern of blue-black stripes, that run transversely across the thoracic segments and longitudinally down the dorsal aspect of the abdominal segments (*vide* Text-fig. 36, A).

♀. No adult females were found, but associated with the males were several examples in the 5th copepodid stage.

Copepodid Stage V.—Total length, 1·055 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 37, A) are as 56 to 44. The proportional lengths of the segments of the posterior region are as follows:

Segment Th. 5.	Abd. 1.	2.	3.	4–5.	Furca.
10	18	22	17	20	13 = 100

The rostrum is well developed and is deflexed; it is sub-triangular in shape with a rounded anterior end. The cephalon is equal in length to the three following segments. The abdomen is composed of only four segments, the last two, as yet, not being differentiated. The posterior margins of all the segments of the abdomen are fringed with fine spinules, and other similar spinules are scattered over the lateral regions of the segments and the postero-dorsal region of the last abdominal segment.

The 1st antenna (Text-fig. 37, B) is short and stout but is composed of the typical nine segments.

In the 2nd antenna (Text-fig. 37, C) the terminal segment of the endopod carries three spines on the anterior margin, and two of the geniculate setæ on the distal margin are replaced by long slender spines; the exopod in this species consists, as in the Mediterranean form of *E. opima* (Brian), of a single segment.

The mouth-parts (Text-fig. 37, D, E and F) and swimming-legs (Text-fig. 37, G, H and I) agree closely with those of other species in the genus.

The 5th legs (Text-fig. 37, K) are not yet fully developed, and the distal segment has not yet been separated off from the basal part. The shape of the two lamellæ, however, clearly foreshadows the condition that will be found in the adult.

The coloration of the animal is conspicuous. The cephalon bears two curved bands in each antero-lateral region, enclosing a linear band within the loop; a short transverse band crosses the anterior region, and posteriorly on each side a transverse band runs inwards from the lateral margin towards, but not reaching the middle line. The two following thoracic segments are traversed by two transverse bands, the anterior one not quite reaching the sides, while the other lies close to the posterior margin of the segment.

The 5th thoracic segment has a transverse band along the anterior margin and a patch of the same colour in each postero-lateral region. The 1st abdominal segment is marked with a bow-shaped band; that in the specimen figured was interrupted on the left side. Segments 2 and 3 are marked with a pair of bands running longitudinally.

All these bands were in the fresh state of a blue-black colour, that turned to a bright red in formalin.

DISTRIBUTION.—Nicobar Islands.

Eudactylopus fasciatus sp. nov. (Text-fig. 38, B–J, ♀; Text-figs. 38, A, 39, A–D, ♂, adult; Text-fig. 39, E–J, ♂, Stage V.)

OCCURRENCE.—Nankauri Harbour, Nicobar Islands, in weed-washings; Addu Atoll, Maldive Archipelago, from among weed growing on the stems of colonies of Stag's Horn Madrepore coral.

DESCRIPTIVE NOTES.—♀. Total length, 1·165 mm. The proportional lengths of the anterior and posterior regions of the body are as 56 to 44. The segments of the posterior region have the following proportional lengths:

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
11	34	20	12	9	14 = 100

The posterior margins of all the abdominal segments are bordered with spinules, and small spinules are scattered over the surface. The furcal rami are slightly longer than broad and are fringed laterally with similar spinules. The distal outer angle bears a spine-like seta and the 2nd seta is longer and thicker than the others.

The 1st antenna (Text-fig. 38, B) consists of nine segments; a basal portion of four segments, the 4th bearing a long sensory filament, is followed by a more slender distal portion of five segments. The basal segment bears two oblique rows of spinules.

In the 2nd antenna (Text-fig. 38, C) the distal segment of the endopod bears three marginal spines on the anterior border, and two of the usual geniculate setæ on the distal border are replaced by needle-like spines. The exopod consists of two segments.

The mandible bears a reduced palp (Text-fig. 38, D), consisting of a basal portion and two rami each composed of one segment, the outer very small.

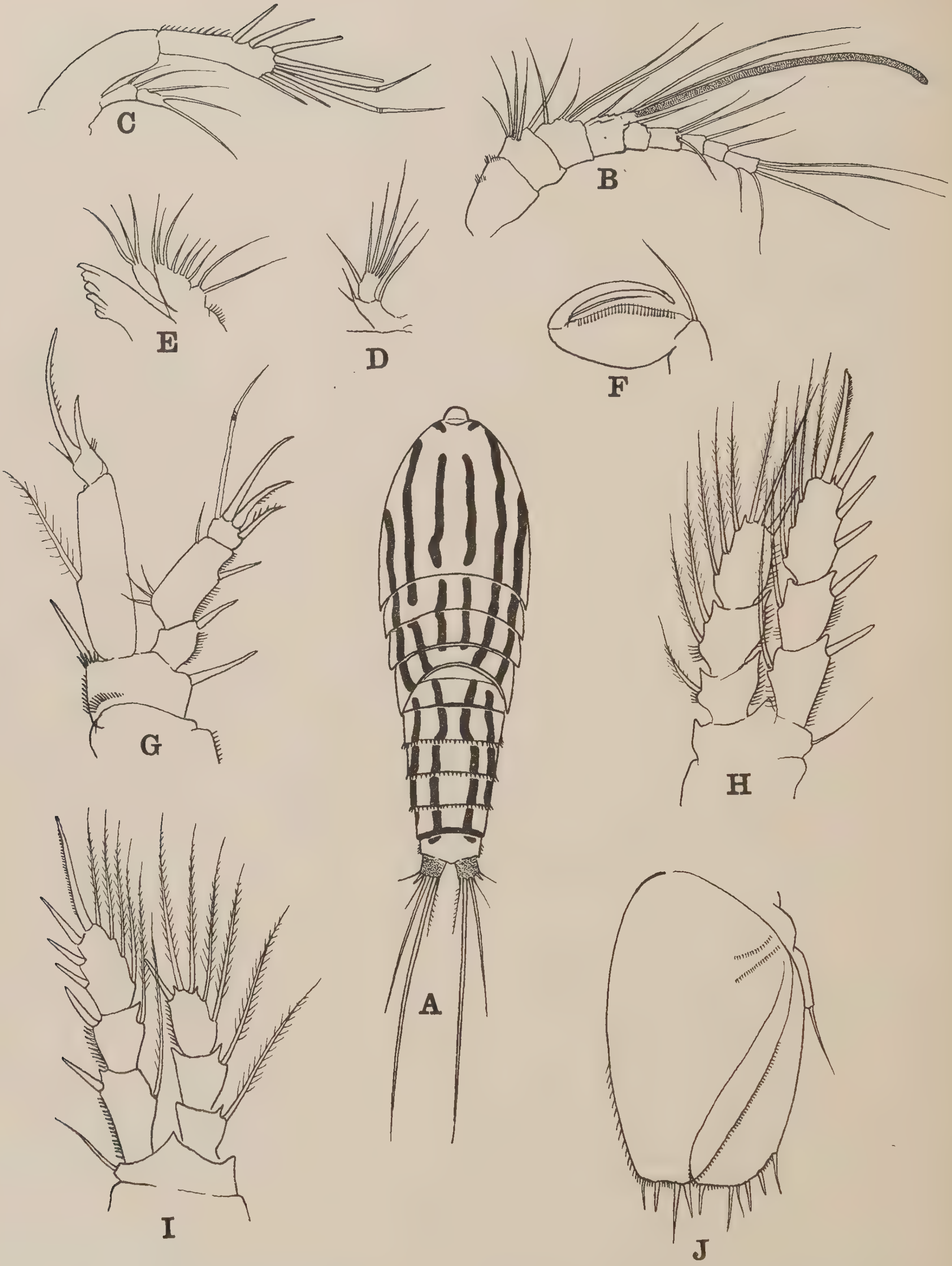
The 1st maxilla (Text-fig. 38, E) possesses a biting-edge, armed with strong teeth, and a palp composed of three lobes.

The maxilliped (Text-fig. 38, F) is strongly developed, the penultimate segment is swollen to form a "hand" and is armed along the anterior margin with a row of spines; the distal segment forms a stout claw, from the base of which arises a single seta.

The 1st pair of legs (Text-fig. 38, G) consists of a three-jointed exopod, in which the 2nd segment is much longer than the others, and a two-jointed endopod, the terminal segment bearing two strong unequal claw-like spines.

In the 2nd–4th pairs of swimming-legs (Text-fig. 38, H, I) both rami are composed of three segments; the 2nd segment of the endopod bears two inner setæ in the 2nd and 3rd legs but only a single seta in the 4th.

The 5th leg (Text-fig. 38, J) is composed of two large foliaceous plates that reach back almost to the hinder edge of the 3rd abdominal segment. The inner plate is oval,



TEXT-FIG. 38.—*Eudactylopus fasciatus* sp. nov. A, Male, dorsal view. B, 1st antenna, female. C, 2nd antenna, female. D, Mandibular palp, female. E, 1st maxilla, female. F, Maxilliped, female. G, 1st leg, female. H, 3rd leg, female. I, 4th leg, female. J, 5th leg, female.

with the distal margin somewhat truncated and provided with four setæ ; the outer plate is very narrow at the base, but expands somewhat distally and reaches to the same level as the inner plate ; its distal margin is provided with six setæ or spines.

The coloration of this species is very conspicuous. The cephalothorax is marked with six bands that run from before backwards ; the centre pair terminate at the posterior margin of the 4th thoracic segment, while the remaining four bands are continued across the 5th thoracic segment and then down the abdomen as far as the anal segment.

♂. The male is less than half the length of the female, measuring only 0·74 mm. in total length. The proportional lengths of the anterior and posterior region of the body (Text-fig. 38, A) are as 55 to 45. The body is robust, and the cephalon bears a bluntly-rounded rostrum of moderate size. The segments of the posterior region have the following proportional lengths :

Segment Th. 5.	Abd. 1.	2.	3.	4.	5.	Furca.
13	15	15	15	15	12	15 = 100

The anterior four abdominal segments are armed along their posterior margins with small spinules, and others are scattered over their surfaces. The furcal rami are slightly longer than broad, and the 2nd furcal seta is stouter and considerably longer than the 3rd ; from the outer distal corner arises a stout spine-like seta.

The genital segment (Text-fig. 39, D) is armed with a slight, posteriorly projecting flap, carrying three setæ, of which the inner is spine-like.

The 1st antenna (Text-fig. 39, A) forms a grasping organ, the basal segments being somewhat swollen.

The 2nd antenna and mouth-parts resemble those of the female.

The 1st pair of legs resemble those of the female.

In the 2nd leg (Text-fig. 39, B) the endopod is modified, the 2nd and 3rd segments being fused together, and from the distal part of the outer and the distal end arise two stout modified spines.

In the 5th leg (Text-fig. 39, C) the inner basal segment is rounded distally and bears three spines, of which the middle one is by far the largest and strongest, the other two being subequal. The margin of the segment is fringed with small spinules. The distal segment is sub-triangular in shape ; from the outer margin arise two stout spines and a delicate seta ; a very long spine arises from the apical border and a small spine from the inner margin, which is also fringed with spinules.

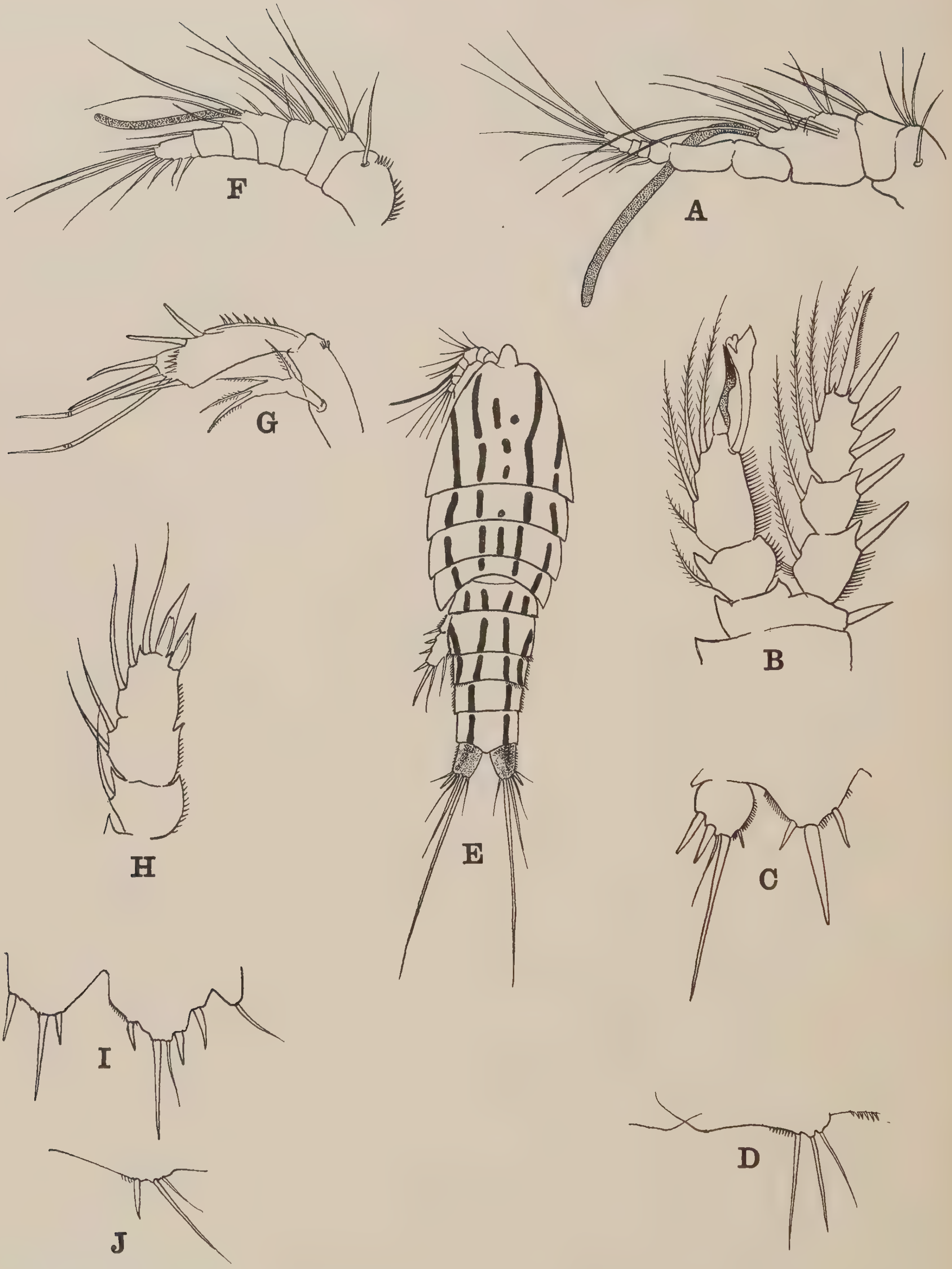
The coloration of the male resembles that of the female. In formalin, soon after being collected, the longitudinal bands were of a rich red colour.

♂. Juv.—*Copepodid Stage V.*

Total length, 1·15 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 39, E) are as 56 to 44. The cephalothorax resembles that of the adult, so far as its structure is concerned ; the abdomen, however, consists of only four segments, the 4th and 5th not yet having become differentiated. The anterior three segments are armed along their posterior margins with small spinules, while others are scattered over the surfaces.

In this stage the 1st antenna (Text-fig. 39, F) consists of only seven segments, the distal, more slender portion of the appendage possessing only three segments, instead of



Text-fig. 39.—*Eudactylopus fasciatus* sp. nov., ♂. A, 1st antenna, adult. B, 2nd leg, adult. C, 5th leg, adult. D, Genital armature, adult. E, Male, Stage V, dorsal aspect. F, 1st antenna, Stage V. G, 2nd antenna, Stage V. H, Endopod, 2nd leg, Stage V. I, 5th leg, Stage V. J, Genital armature, Stage V.

five as in the adult female; the 1st segment carries two rows of small spinules, and the 4th segment bears a long sensory filament.

In the 2nd antenna (Text-fig. 39, G) the main branch resembles that of the adult, but the exopod consists of only a single segment, scarcely a trace of the division into two being as yet visible.

The mouth-parts and the 1st swimming-legs resemble those of the adult.

The 2nd leg (Text-fig. 39, H) is beginning to show the modification of the endopod that is characteristic of the adult male; the 2nd and 3rd segments are fused, and distally there are two pointed thickened spines at the distal outer angle.

The 5th leg (Text-fig. 39, I) is unsegmented, and the two rami are represented by backwardly-directed extensions of the margin of the 5th thoracic segment; the characters of the spines and setæ that are to be found in the adult are clearly shown.

In this stage the characteristic markings of the adult are not yet fully developed, though such as are present clearly approximate to the final type. On the cephalothorax only four longitudinal stripes, two on each side, are fully formed, and these, as in the adult, are continued backwards on to the abdomen, but the outermost band only reaches the posterior margin of the 2nd segment, and the innermost is continued to the posterior margin of the 4th segment and then is faintly continued along the dorsal aspect of the furcal ramus. The inner pair of stripes that are present in the adult are here represented by a series of interrupted dots and lines on the cephalothorax and the 2nd and 3rd thoracic segments, the only trace of the double condition being seen in the anterior part of the cephalon.

The furcal rami are uniformly tinged with purple.

DISTRIBUTION.—At present known only from the Nicobar Islands and the Maldive Archipelago.

? *Eudactylopus anomala* sp. nov. (Text-fig. 40, A–J.)

OCCURRENCE.—Addu Atoll, Maldive Archipelago, in weed-washings; a single specimen, male.

DESCRIPTIVE NOTES.—♂. Total length, 0·65 mm. The anterior region is robust and the body (Text-fig. 40, A) tapers gradually to the posterior end, without any very marked difference between the anterior and posterior regions. The proportional lengths of the anterior and posterior regions are as 64 to 36. The rostrum is of moderate size and tapers to a rounded point. The cephalosome is large and is equal in length to the following five segments. The abdomen is composed of the usual five segments, which are subequal in length. The furcal rami are as long as broad. The 2nd furcal seta is long, and equals in length the whole body.

The 1st antenna (Text-fig. 40, B) is modified to form a moderately strong grasping organ; it is composed of eight segments; the 1st and 4th segments are subequal and the 2nd and 3rd are considerably shorter. The 3rd and 4th segments bear a sensory filament. The hinge is situated between the 5th and 6th segments, so that the terminal part is composed of three segments.

In the 2nd antenna (Text-fig. 40, C) the endopod is composed of two segments. The 2nd segment bears a series of small spinules on its anterior margin proximal to the 1st spine; there are four spines, increasing in length, two geniculate setæ and two normal setæ at the distal end. The exopod is composed of only a single segment, as in *E. spectabilis*

(Brian), and bears two setæ close together at about the junction of the proximal and middle thirds, one seta at about the junction of the middle and distal thirds and two setæ distally.

The mandible (Text-fig. 40, D) bears a small palp with two unjointed rami.

The 2nd maxilla (Text-fig. 40, E) resembles that of *Parathalestris clausi*.

The maxilliped (Text-fig. 40, F) is of stout build, with a markedly swollen " hand ", the anterior margin of which is fringed with hairs.

In the 1st leg (Text-fig. 40, G) the 1st basal segment bears a seta on its inner margin, and distal to this the border is fringed with hairs. The 2nd basal segment is sub-triangular in shape, as in the genus *Thalestris*; it bears a short spine at the distal outer angle and the distal inner angle is produced in a blunt knob. The exopod is composed of three segments, of which the 2nd is very long. The 1st segment bears a single marginal spine, but has no seta on the inner border. The external margins of the 2nd and 3rd segments possess a rib of thickened chitin. The 2nd segment bears a single outer spine and the inner seta arises from near the distal end. The 3rd segment bears four spines that increase in size distally, the 4th spine being as long as the whole ramus. The endopod is shorter than the exopod, reaching only as far as the distal margin of the 2nd segment; it is composed of only two segments. The proximal segment is somewhat produced internally near the base, and from this swollen part arises a single seta. The distal segment bears two stout, unequal, claw-like spines and a minute seta.

The 2nd leg (Text-fig. 40, H) is modified. The exopod consists of three segments. The 2nd basal segment bears an outer spine and the inner margin is produced at the distal angle in a triangular spinous process. The exopod consists of three segments; the 1st and 2nd segments each bear a marginal spine and a single inner seta; the 3rd segment bears 2, 2, 3 spines and setæ. The endopod is composed of only two free segments, segments 2 and 3 being fused. The terminal segment bears a single seta on that part of its inner margin that corresponds to the 2nd segment, and the terminal part bears a single seta at the distal inner angle and three modified setæ at the distal end and the distal outer angle.

In the 4th leg (Text-fig. 40, I) the two rami are composed of three segments; the endopod is short, and only reaches as far as the distal end of the 2nd segment of the exopod; the setal formula for this leg is 1.1.2, 2, 1 : 1.1.3, 2, 3.

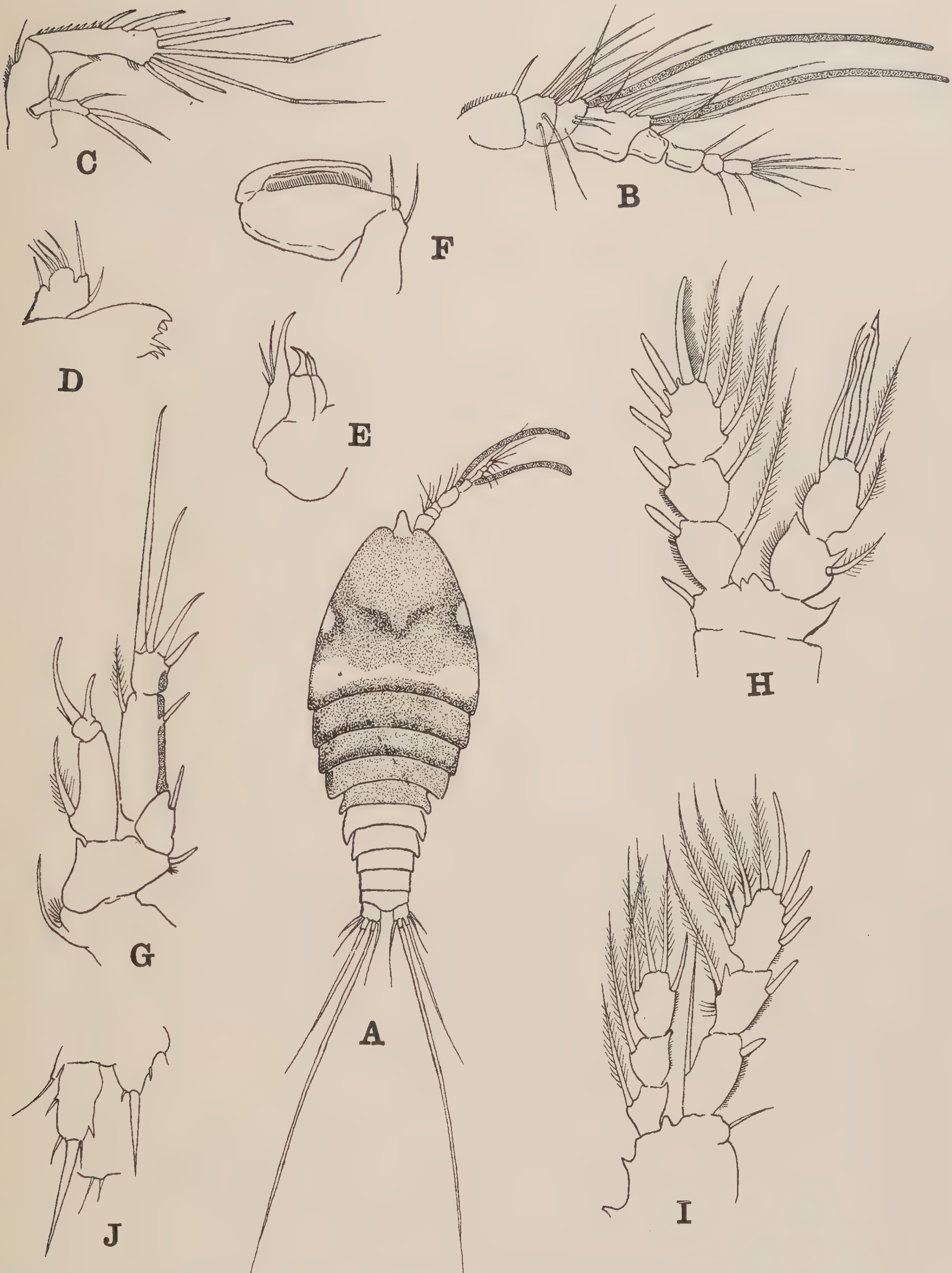
In the 5th leg (Text-fig. 40, J) the proximal segment is produced in a triangular process that reaches about one-third the length of the distal segment; from its apex arises a single stout spine, and a very small spine arises from both the inner and outer border. The distal segment appears to be incompletely separated off; the outer border bears two small setæ; from the apex arises a long stout spine, on the inner side of which is a delicate seta; the inner border is produced in a sharp pointed process.

The genital aperture is guarded by a delicate spine and a seta.

The cephalosome is stained brown, except for a light patch on each side about the middle of its length and a "dumb-bell" shaped area immediately in front of the posterior border. The 2nd–5th thoracic segments are also stained brown, and a darker band of the same colour runs along the posterior margin of segments 2 and 3.

Remarks.—It is with very great hesitation that I provisionally refer this specimen to the genus *Eudactylopus*, and it is probable that when the female is discovered a new genus will have to be created.

Distribution.—At present known only from the Maldive Archipelago.



Text-fig. 40.—? *Eudactylopus anomala* sp. nov., ♂. A, Male, dorsal view. B, 1st antenna. C, 2nd antenna. D, Mandible. E, 2nd maxilla. F, Maxilliped. G, 1st leg. H, 2nd leg. I, 4th leg. J, 5th leg and genital armature.

Genus *Dactylopusia* Norman.

Thompson and A. Scott (1903), recorded from the Indian Ocean and the Ceylon Pearl Banks a number of species which they referred to this genus, but almost all of these have now been removed to other genera, as the following list indicates :

Dactylopusia thisboides (Claus).
D. latipes (T. Scott).
    [= *Eudactylopus latipes* (T. Scott).]
D. dentatus Thompson and A. Scott.
    [= *Amphiascus dentatus* (Thompson and A. Scott).]
D. havelocki Thompson and A. Scott.
    [= *Amphiascus havelocki* (Thompson and A. Scott).]
D. hirsuta Thompson and A. Scott.
    [= *Amphiascus hirsuta* (Thompson and A. Scott).]
D. ceylonica Thompson and A. Scott.
    [= *Amphiascus cinctus* (Claus).]
D. robusta Thompson and A. Scott.
    [= *Amphiascus robusta* (Thompson and A. Scott).]
D. hamiltoni Thompson and A. Scott.
    [= *Diosaccus hamiltoni* (Thompson and A. Scott).]
D. laticaudata Thompson and A. Scott.
    [= *Xouthous laticaudata* (Thompson and A. Scott).]
D. æmula Thompson and A. Scott.
    [= *Xouthous æmula* (Thompson and A. Scott).]
D. platysoma Thompson and A. Scott.
    [? Genus.]

A. Scott (1902) recorded the occurrence of *Dactylopusia strömii* (Baird) from the Gulf of Suez ; but Sars later pointed out that some confusion had arisen regarding this species, and that the form considered by Claus to be *D. strömii* is not the same as Baird's species, which belongs to the genus *Laophonte* ; he therefore renamed Claus' form *Dactylopusia vulgaris* ; it is thus uncertain whether Scott's example should be referred to *D. vulgaris* Sars or to *Laophonte strömii* (Baird), but in all probability it was an example of the former.

Gurney (1927*c*) recorded the occurrence of *Dactylopusia thisboides* (Claus) and a second species, *D. oculata* Gurney, from the Suez Canal.

Dactylopusia thisboides (Claus).

Dactylopusia thisboides, Sars, 1903–11, p. 126, pl. lxxvii*b*, lxxviii, 1 ; Monard, 1928*a*, p. 349, fig. xix, 1.
Dactylopusia spinipes, Brady, 1910, p. 540, fig. xxxi, 1–5.

Occurrence.—Nankauri Harbour, Nicobar Islands, in weed-washings.

Descriptive Notes.—♀. Total length 0·71 mm. This is somewhat smaller than Monard's specimens from the Mediterranean, that measure 0·9 mm. in length. The proportional lengths of the anterior and posterior regions of the body are as 56 to 44. The proportional lengths of the segments of the posterior region are as follows :

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
18	34	17	19	8	4 = 100

The 2nd furcal seta is somewhat dilated at the base, as Brady (1910, p. 540, fig. xxxi, 5) has shown it in his *D. spinipes*; the ground on which he separated his form from *D. thisboides* (Claus), namely the presence of spines on the inner flap of the proximal segment of the 5th leg, is, I think, due merely to a misconception.

The 1st antenna reaches back a little beyond the middle of the cephalosome; it consists of eight segments having the following proportional lengths:

Segment 1.	2.	3.	4.	5.	6.	7.	8.
18	16	13	11	11	10	8	13 = 100

Distribution.—The species appears to be widely distributed throughout all the three great oceans from the Antarctic to the Arctic regions.

Wilson (1932, p. 207, fig. 138*a–c*) has recorded what he took to be examples of this species from various localities in the Wood's Hole region, including one of brackish water. In his account of the female he states that the 5th leg possesses a basal segment that is "broadly foliaceous, reaching the tip of the distal segment". In my examples this inner expansion reaches only to about two-thirds of the length of the free segment, which is much longer than in Willey's specimens; there are also slight differences in the respective lengths of certain of the setæ arising from the free segment, and it seems doubtful whether Willey was correct in his diagnosis.

Dactylopusia falcifera Willey.

Dactylopusia falcifera, Willey, 1935, p. 73, figs. 92–97.

Occurrence.—Nankauri Harbour, Nicobar Islands, in weed-washings; several examples of both sexes.

These examples of the female fall into two quite distinct groups according to their coloration. In one group the specimens were of a purple coloration, whereas in the other they were of a golden-orange tint. Of the two forms, the latter appear to agree more closely with the description given by Willey, and the colour difference is very reminiscent of the similar difference observed by Willey in *Amphiascus cinctus* (*vide* Willey, 1935, p. 53), but whereas in this latter species Willey found that the pale specimens were immature, there was nothing to be found in the structure of the pale examples of *Dactylopusia falcifera* that would warrant any such assumption.

f. *violacea*. (Text-fig. 41, A–N.)

Descriptive Notes.—♀. Total length 0·74 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 41, A) are as 57 to 43. The anterior region is robust. The rostrum is well developed and is bluntly rounded anteriorly; two small sensory hairs arise near the apex. The posterior region tapers slightly. The 5th thoracic and the first three abdominal segments each bear a row of fine spinules in the lateral region; those on the 5th thoracic and the 1st and 3rd abdominal segments run approximately parallel to the posterior margin of the segment, but that on the 2nd abdominal segment runs from in front backwards and slightly dorsalwards across the greater part of the width of the segment (*vide* Text-fig. 41, A). A row of spinules fringes the articulation of the 5th abdominal segment with the furcal rami.

The furcal rami are considerably wider than long and the 2nd furcal seta is the longest, and is in most individuals, though not in all, thickened at the base.

The proportional lengths of the segments of the posterior region of the body are as follows :

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
19	33	19	16	9	4 = 100

The 1st antenna (Text-fig. 41, B) consists of eight segments that have the following proportional lengths :

Segment 1.	2.	3.	4.	5.	6.	7.	8.
23	20	15	9	7	6	7	13 = 100

The 2nd antenna (Text-fig. 41, D) and mouth-parts (Text-fig. 41, E–H) closely resemble those of *D. thisboides* (Claus).

In the 1st leg (Text-fig. 41, I) both rami are composed of three segments, but the 2nd and 3rd segments of the endopod are extremely small. The exopod reaches to about half the length of the proximal segment of the endopod. Basal 1 bears a pointed serrated spine at the distal inner angle, and a spine at the distal outer angle.

In the 2nd (Text-fig. 41, K) leg the 2nd basal segment is produced in a spine-like process at the distal inner angle, and the seta on exopod 1 is reduced to a small pointed process.

The 5th leg (Text-fig. 41, M) closely resembles that of *D. thisboides* (Claus), but lacks the thickening of the chitin along the internal margin of the proximal segment.

In life these examples were coloured a purple hue, the depth of colouring being much deeper on the anterior abdominal segments and forming a pattern on the cephalosome, as indicated in the figure (Text-fig. 41, A).

♂. In the corresponding male the grasping antenna (Text-fig. 41, C) appears to consist of seven segments.

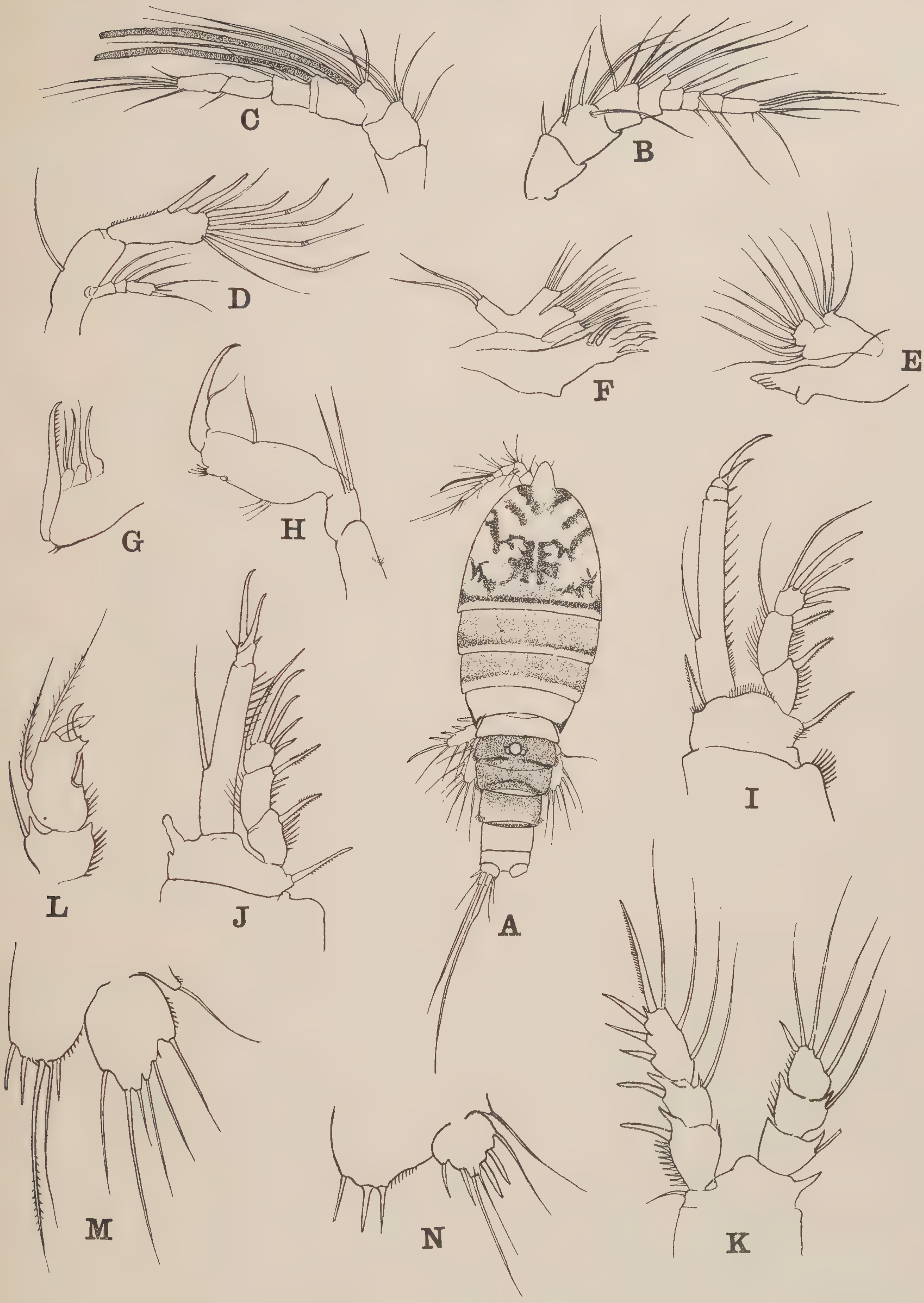
The 1st leg (Text-fig. 41, J) exhibits a slight modification of the spine at the distal inner angle of the 2nd basal segment, for in this sex it is stouter and is bluntly rounded at its apex.

The 2nd leg shows the characteristic modification of the endopod (Text-fig. 41, L). The 2nd and 3rd segments are fused together and from the inner margin of the combined joint arise two setæ, the distal springing from close to the distal end ; on the outer margin about half-way along its length arises a single spine, and from the distal end, which is emarginate, arise two spines, of which the outer is curved, and the inner is arrow-like and is directed outwards ; these two spines thus cross each other, and closely resemble the condition that is found in *Westwoodia assimilis* Sars (*vide* Sars, 1903–11, pl. lxxxvii).

In the 5th leg (Text-fig. 41, N) the proximal segment bears three subequal spines, and the distal free segment, which is broader than long, bears two short setæ on its inner margin, two unequal delicate setæ on its apex, and two subequal spines and a delicate seta on its outer margin.

There is a close degree of similarity in the endopod of the 2nd leg and the 5th leg of the male of this species and the corresponding parts in the male of *Pseudothalestris imbricata* as figured by Brady (1883, pl. xlii, fig. 5).

Associated with these examples were a few others, of approximately the same size



Text-fig. 41.—*Dactylopusia falcifera* Willey, f. *violacea*. A, Female, dorsal view. B, 1st antenna, female. C, 1st antenna, male. D, 2nd antenna. E, Mandible. F, 1st maxilla. G, 2nd maxilla. H, Maxilliped. I, 1st leg, female. J, 1st leg, male. K, 2nd leg, female. L, Endopod of 2nd leg, male. M, 5th leg, female. N, 5th leg, male.

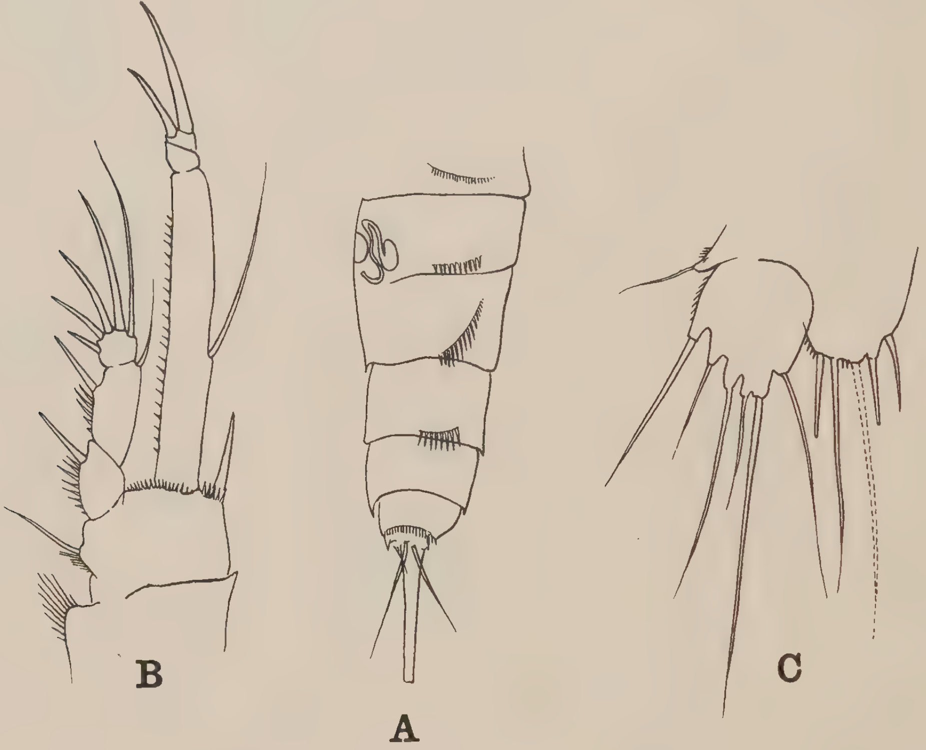
but differing in coloration and in certain details of structure ; to these specimens I propose to give the name f. *pallida*.

f. *pallida*. (Text-fig. 42, A–C.)

♀. Total length, 0·72 mm.

The proportional lengths of the anterior and posterior regions of the body are as 58 to 42. The proportional lengths of the segments of the posterior region are as follows :

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
20	35	18	16	8	3 = 100



TEXT-FIG. 42.—*Dactylopusia falcifera* Willey, f. *pallida*, ♀. A, Abdomen, lateral view. B, 1st leg. C, 5th leg.

It would thus appear that the 4th abdominal segment is somewhat shorter in this form than in f. *violacea*, but it is possible that this may be apparent rather than real, and may be due to a state of contraction of the abdomen masking the true length of the segment. The 2nd furcal seta in these examples was simple and was not dilated at the base.

The 1st antenna consists of eight segments having the following proportional lengths :

Segment 1.	2.	3.	4.	5.	6.	7.	8.
22	18	16	9	8	8	6	13 = 100

The mouth-parts and swimming-legs are identical in the two forms.

In the 5th leg (Text-fig. 42, C) the distal segment is somewhat broader in proportion to its length than in *F. violacea*, and the margin is more deeply indented between the points of origin of the setæ that arise from it.

These examples, instead of being tinged with purple, were of a golden-orange colour.

Distribution.—At present known only from the Nicobar Islands and from Bermuda (Willey).

Dactylopusia brevicornis (Claus).

Dactylopusia brevicornis, Sars, 1903–11, p. 130, pl. lxxx; T. Scott, 1906, p. 276, pl. xiv, figs. 10–18; Sewell, 1924, p. 819; Wilson, 1932, p. 206, figs. 137*a–e*.

Occurrence.—Addu Atoll, Maldive Archipelago, in weed-washings.

Descriptive Notes.—♂. Total length, 0·55 mm.

The proportional lengths of the anterior and posterior regions are as 66 to 34. The proportional lengths of the segments of the posterior region are as follows:

Segment Abd. 1.	2.	3.	4.	5.	Furca.
27	18	15	15	18	7 = 100

The 4th and 5th abdominal segments are fringed with small spines laterally, and the furcal rami also bear small spinules.

The mouth-parts and appendages agree closely with the description and figures given by Sars (*loc. cit.*).

The specimens were coloured with blue and pink patches and bands, as follows: On the cephalosome a blue patch in the middle line anteriorly and a larger hemispherical blue patch on the posterior part in the middle line, with smaller patches of the same colour at the postero-lateral angles; small patches of pink colour on the lateral aspect and at the base of the 1st antenna. The 2nd thoracic segment shows a band of blue right across the posterior half of the segment. On the 3rd thoracic segment is a transverse blue patch extending across the dorsal area but not reaching the sides. The 1st, 2nd and 3rd abdominal segments are marked with a band of pink, that on the 2nd and 3rd segments being close against the anterior border.

Distribution.—The Chilka Lake (Sewell), the Maldive Archipelago (present record), the Mediterranean Sea (Claus, Brian, Monard, Lang), the coast of North America, Chesapeake Bay (Wilson) and Wood's Hole (Willey), the British Isles (Brady, T. Scott), the coast of Norway (Sars) and the Arctic region, Grinnel Land (Sars).

Dactylopusia tropica sp. nov. (Text-fig. 43, a–i.)

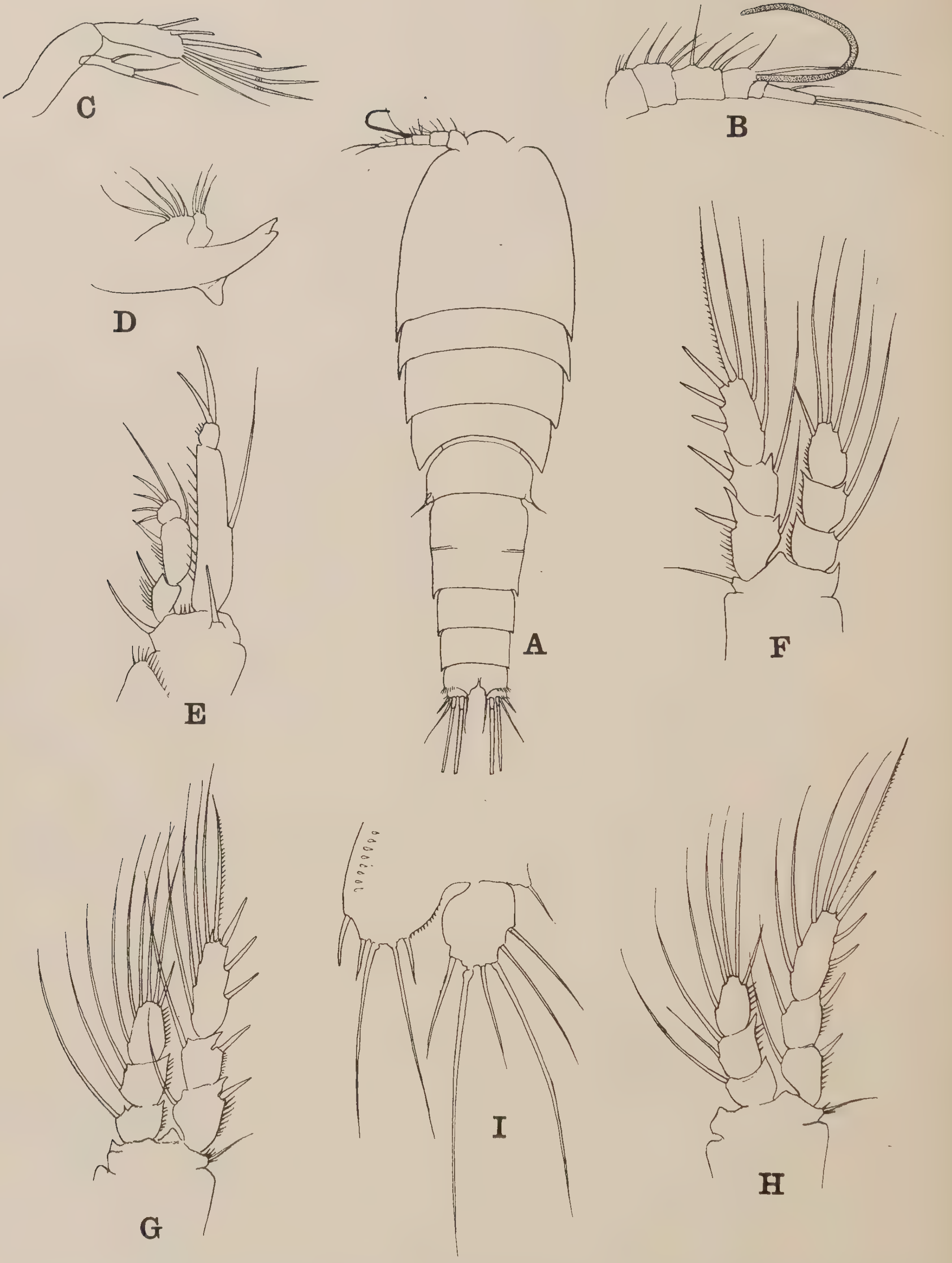
Occurrence.—Addu Atoll, Maldive Archipelago, in weed-washings.

Descriptive Notes.—♀. Total length, 0·56 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 43, a) are as 30 to 20. The anterior region is moderately robust; the anterior margin is rounded, and the rostrum, when the animal is viewed from the dorsal aspect, does not project. The cephalosome is equal in length to the following three segments. The posterior region tapers slightly and the proportional lengths of the segments are as follows:

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
22	32	16	16	9	5 = 100

There is a distinct line of fusion between the 1st and 2nd segments in the lateral region. The anal segment bears a row of small spinules along the articulation with the furcal rami. The furcal rami are twice as broad as long.



TEXT-FIG. 43.—*Dactylopusia tropica* sp. nov. A, Female, dorsal view. B, 1st antenna. C, 2nd antenna. D, Mandible. E, 1st leg. F, 2nd leg. G, 3rd leg. H, 4th leg. I, 5th leg.

The 1st antenna (Text-fig. 43, B) consists of only six segments, of which the 3rd is longer than either the 2nd or 4th; the 5th segment is very short. The 4th segment bears a long sensory filament.

The 2nd antenna (Text-fig. 43, C) is composed of two segments; the exopod is reduced, and consists of only a single segment that bears three setæ.

The mandible (Text-fig. 43, D) tapers to a biting edge that is formed of only two teeth, and there is a sharply conical projection on the posterior border; the palp is small, and appears to possess two branches.

In the 1st leg (Text-fig. 43, E) basal 1 bears a row of spinules on its outer surface; basal 2 is furnished with two, somewhat delicate spines at the inner and outer distal angles respectively. The exopod is composed of three segments and is a little more than half the length of the endopod; the 2nd segment is nearly twice the length of the 1st. The endopod is composed of two segments only; the proximal segment is long, and bears one seta on the inner margin at about the middle of its length; the distal segment is short and bears two long claw-like spines.

The 2nd, 3rd and 4th legs (Text-fig. 43, F–H) are of the usual *Dactylopusia* type, and the arrangement of setæ and spines on the various segments is shown in the following table:

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P2	1	1	2, 2, 1	1	1	2, 2, 3
P3	1	2	3, 2, 1	1	1	3, 2, 3
P4	1	2	2, 2, 1	1	1	3, 2, 3

In the 5th leg (Text-fig. 43, I) the basal segment bears five setæ and a line of thickened areas runs down the inner margin, as in *Dactylopusia thisboides* and other species of the genus; the distal, free segment is oval in shape and bears 6 setæ.

In the structure of the 1st and 2nd antennæ this species differs from other members of the genus *Dactylopusia* and agrees with the genus *Dactylopusioides* Brian. This latter genus was erected by Brian (1928, p. 338) to accommodate a new species, *D. stampaliæ*, that he had taken in the Ægean Sea. In *D. stampaliæ*, however, there is a reduction in the number of marginal spines on the 3rd segment of the exopod of the 3rd and 4th legs, and possibly also on the 2nd, but Brian neither figures nor describes this last.

The present form thus appears to form a connecting link between the genera *Dactylopusia* and *Dactylopusioides*, and for the present I prefer to group it with the former genus.

DISTRIBUTION.—The Maldive Archipelago.

Genus *Jalysus* Brian.

Jalysus, Brian, 1927.

This genus was created by Brian to accommodate a new species that was taken by him in the Ægean Sea; Gurney (1927*c*, p. 505, fig. 133) has recorded finding the same species in the Suez Canal. Two other species that appear to belong to this genus were taken in the Maldive Archipelago.

Jalysus investigatoris sp. nov. (Text-fig. 44, A–K, ♀; Text-fig. 45, A–H, ♂.)

OCCURRENCE.—Addu Atoll, Maldive Archipelago, in weed-washings.

DESCRIPTIVE NOTES.—♀. Total length, 0·89 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 44, A) are as 60 to 30. The anterior region is robust and almost hemispherical, while the posterior region tapers considerably, so that the appearance of the whole animal closely resembles that of a *Westwoodia.* The rostrum is short and stout, bluntly pointed and depressed, so that it is barely visible from the dorsal aspect. The cephalosome is highly vaulted. The proportional lengths of the segments of the posterior region are as follows :

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
15	30	15	19	14	7 = 100

The genital segment is considerably wider than long, and the line of fusion of the two segments is plainly visible in the dorso-lateral region. The furcal rami are considerably broader than long; the outer distal angle is armed with a short straight spine and from the distal border arise four setæ, of which the 2nd is by far the longest, the others being quite short and delicate.

The 1st antenna (Text-fig. 44, B) is short and is composed of eight segments that have the following proportional lengths :

Segment 1.	2.	3.	4.	5.	6.	7.	8.
24	16	20	13	5	5	7	10 = 100

Segments 3 and 4 each bear a long sensory filament and segment 1 bears a row of spinules along the distal margin ; but there is no stout spine present on segment 2, such as is present in *J. rufus* Brian.

The 2nd antenna (Text-fig. 44, C) is stoutly built and consists of two segments. The exopod is reduced to a single segment that bears three setæ.

The mandible (Text-fig. 44, D) is provided with a straight rod-like palp, that bears four setæ on its distal margin.

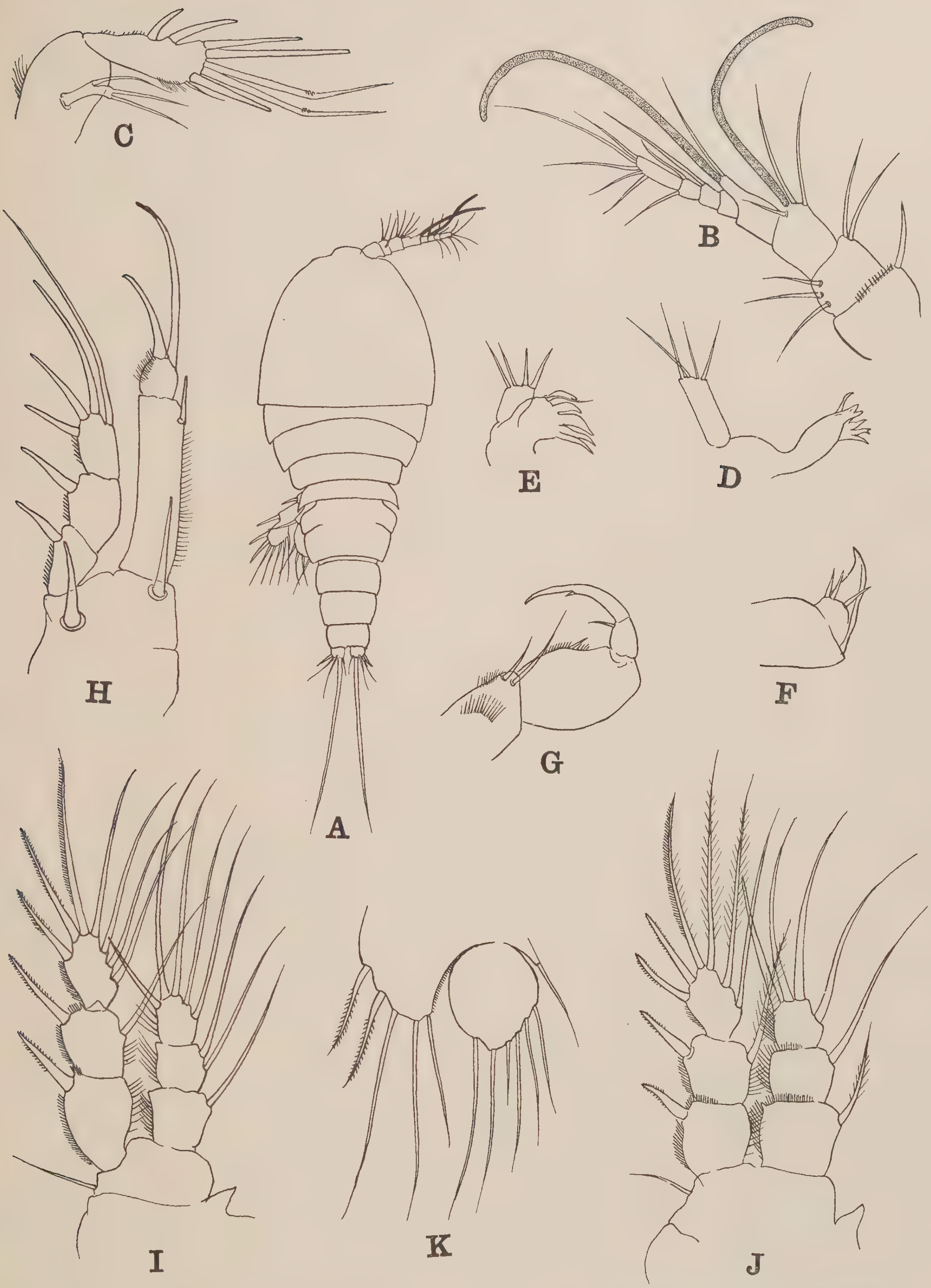
Gurney (1927*c*, p. 505) states that the maxillæ are " as in *Dactylopusia* ", but in the present species the 1st maxilla (Text-fig. 44, E) has a biting lobe bearing five teeth, and the palp is uniramous and bears four setæ at its distal end.

The 2nd maxilla (Text-fig. 44, F) is very stoutly built and the claw on the terminal lobe is stout and strong.

The maxilliped (Text-fig. 44, G) forms a stout claw ; the terminal claw bears a small spine on its inner margin about half-way along its length.

In the 1st leg (Text-fig. 44, H) the 2nd basal segment bears a short spine on both the inner and outer distal angles. The exopod is composed of three segments, and reaches almost to the distal end of the 1st segment of the endopod ; the inner margins of the three segments of the exopod are devoid of setæ and the 3rd segment bears on its outer margin only two marginal spines, and an end-spine and a single seta arise from the distal border. The proximal segment of the endopod bears a short spine-like seta on its inner border near the distal end ; the distal segment is globular and bears two long curved spines.

In the 2nd, 3rd and 4th legs (Text-figs. 44, I and J), both exopod and endopod are composed of three segments, and the terminal segment of the exopod bears only two



Text-fig. 44.—*Jalysus investigatoris* sp. nov., ♀. A, Female, dorsal view. B, 1st antenna. C, 2nd antenna. D, Mandible. E, 1st maxilla. F, 2nd maxilla. G, Maxilliped. H, 1st leg. I, 2nd leg. J, 4th leg. K, 5th leg.

marginal spines instead of the usual three. The setal formula for the swimming-legs is as follows :

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P2	1	2	2, 2, 1	0	1	3, 2, 2
P3	1	1	2, 2, 1	0	1	3, 2, 2
P4	1	1	1, 2, 1	0	1	2, 2, 2

The 5th leg (Text-fig. 44, K) is of the "*Dactylopusia*" type, but does not exhibit any line of thickenings of the chitin, such as is found in *D. thisboides* (Claus) ; the proximal segment is expanded and bears five setæ ; the distal free segment projects somewhat beyond the distal end of the inner plate, is sub-circular in shape, and carries six setæ.

♂. Total length 0·81 mm.

The proportional lengths of the anterior and posterior regions of the body are as 68 to 32. There is no sharp line of division between the two regions, and the body tapers gradually to the posterior end.

The 1st antenna (Text-fig. 45, A) is modified to form a grasping organ and reaches back to about the middle of the cephalosome.

The 2nd antenna is very like that of *Jalysus rufus* Brian, but has two setæ at the distal end of the exopod instead of only one.

The 1st leg resembles that of the female.

In the 2nd leg (Text-fig. 45, B) the endopod is modified, segments 2 and 3 being fused. From the base of the distal segment two modified setæ arise, and the distal part of the joint bears two normal setæ on its inner margin and one distally.

The 3rd and 4th legs resemble those of the female.

In the 5th leg (Text-fig. 45, C) the proximal segment bears two spines, and the distal free segment is almost circular in outline and bears 4 setæ, the inner two of which are thickened and spine-like; the distal of these setæ is of considerable length, and is equal to about three times the length of the segment itself and twice the length of the proximal.

The genital segment is armed on its posterior margin by a stout spine and two setæ, which arise from a short prolongation of the posterior border.

In colour the examples of this species were dark brown.

Associated with these adults was a young individual in the 5th Copepodid stage.

Copepodid Stage V.—Total length 0·62 mm.

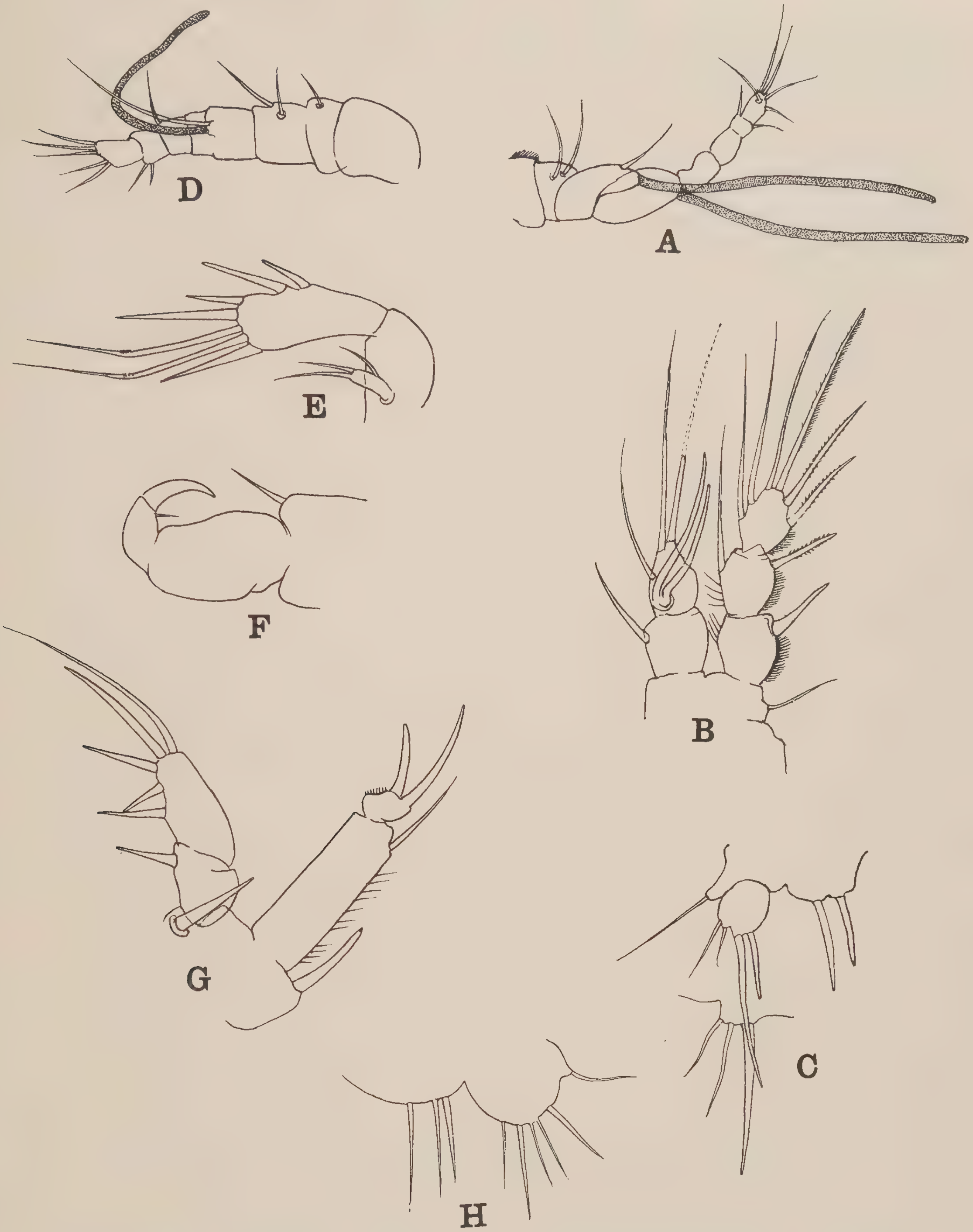
The proportional lengths of the anterior and posterior regions of the body are as 71 to 29. The 4th and 5th abdominal segments have not yet become differentiated.

The 1st antenna (Text-fig. 45, D) is very short, but is composed of the full number—eight—of segments ; the 4th segment bears a long sensory filament.

The 2nd antenna (Text-fig. 45, E) is fully developed, and the exopod consists, as in the adult, of a single segment, bearing three setæ.

The maxilliped (Text-fig. 45, F) is powerful and the terminal claw-like segment is very short.

In the 1st leg (Text-fig. 45, G) the exopod is composed of only two segments, thus resembling a *Parathalestris* ; the distal segment represents segments 2 and 3, and on the outer margin bears three marginal spines and distally a single spine and a seta ; thus at the next stage when segments 2 and 3 become differentiated, the 3rd segment will, as we have seen, bear only two marginal spines.



TEXT-FIG. 45.—*Jalysus investigatoris* sp. nov., ♂. A, 1st antenna, male, adult. B, 2nd leg, adult. C, 5th leg and genital armature, adult. D, 1st antenna, juv. E, 2nd antenna, juv. F, Maxilliped, juv. G, 1st leg, juv. H, 5th leg, juv.

The segments of the 5th leg (Text-fig. 45, H) have not yet become differentiated; the inner lobe bears three setæ and the outer five.

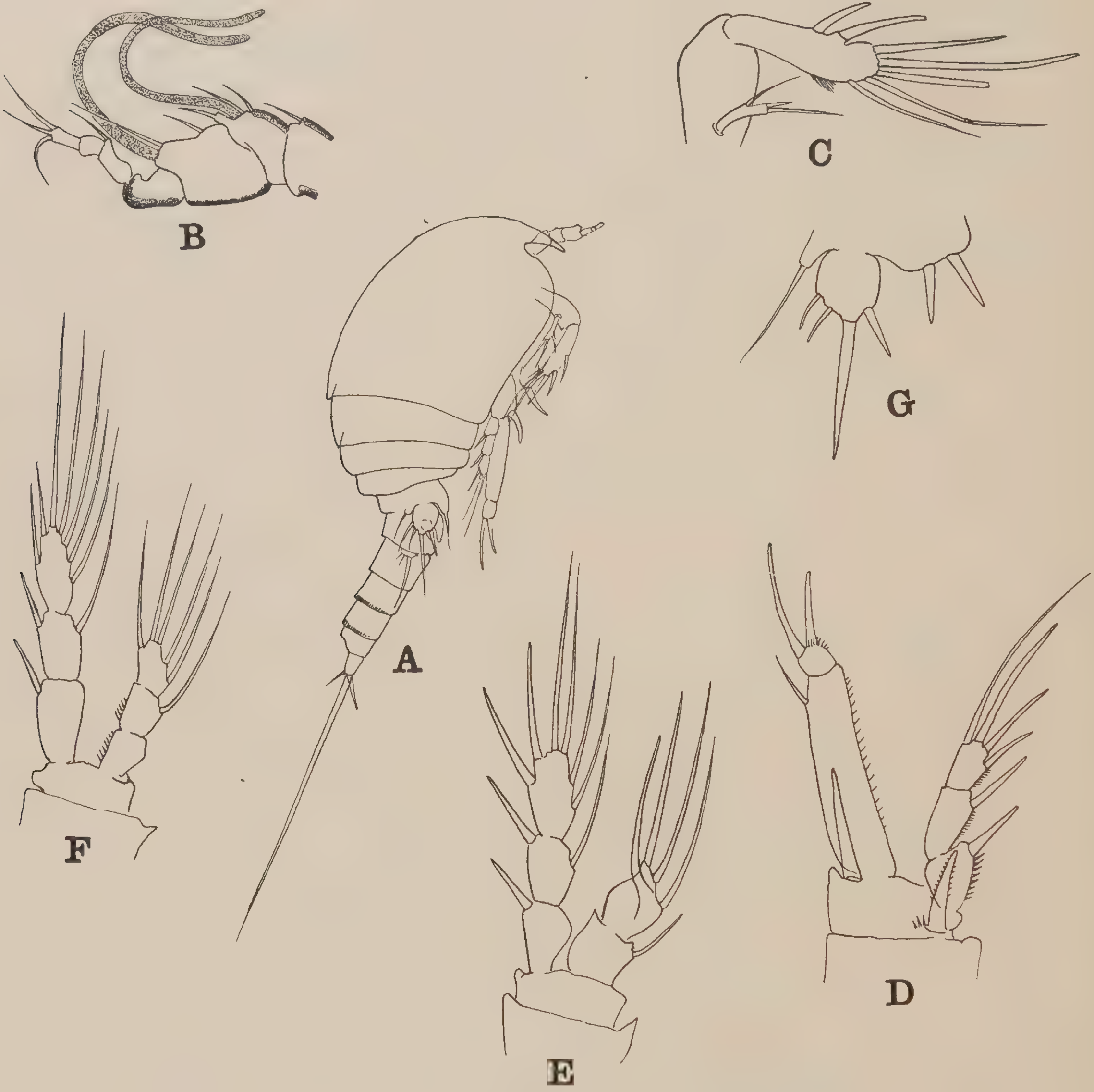
DISTRIBUTION.—At present known only from the Maldive Archipelago.

Jalysus proximus sp. nov. (Text-fig. 46, A–G.)

OCCURRENCE.—Addu Atoll, Maldive Archipelago, in weed-washings.

DESCRIPTIVE NOTES.—♂. Total length, 0·51 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 46, A) are as 34 to 14.



TEXT-FIG. 46.—*Jalysus proximus* sp. nov., ♂. A, Male, lateral view. B, 1st antenna. C, 2nd antenna. D, 1st leg. E, 2nd leg. F, 3rd leg. G, 5th leg.

In its general appearance this species, like *Jalysus investigatoris*, closely resembles a *Westwoodia*. The abdominal segments have the following proportional lengths :

Segment Abd. 1.	2.	3.	4.	5.	Furca.
19	19	19	22	15	6 = 100

The posterior margins of segments 3 and 4 are either armed with a row of fine needle-like spinules, or else possess a band across them that is ridged like the " milled " edge of a coin, but I was unable to determine which of the two interpretations is the correct one. The furcal rami are one and a half times as broad as long, and are armed at the distal outer angle with a straight spine. The 2nd furcal seta is long and well developed.

The 1st antenna (Text-fig. 46, B) forms a powerful grasping organ and appears to consist of eight segments, of which the 3rd and 4th bear each a long sensory filament.

The 2nd antenna (Text-fig. 46, C) is composed of two segments, of which the proximal is stout; the distal segment bears four spines on the anterior margin and distal angle, two geniculate setæ on the distal border and a single simple seta on the lower margin near the distal end. The exopod consists of a single segment bearing three setæ, one on the anterior margin and two, very unequal, setæ distally.

In the rest of its appendages this form very closely resembles the male of the preceding species, but there are slight differences. In the 1st leg (Text-fig. 46, D) the exopod is distinctly shorter and only reaches to about two-thirds the length of the proximal segment of the endopod. The two spines on the distal segment on the endopod are shorter.

In the 2nd, 3rd and 4th legs (Text-fig. 46, E and F) the rami are more slender, and the endopod, especially in the 3rd and 4th legs, is relatively shorter. In the 2nd leg the endopod consists of only two segments, and arising from the base of the distal segment I could detect only one modified seta instead of two. As in *Jalysus investigatoris*, the third segment of the exopods of the 2nd–4th legs bears only two marginal spines, but these are more slender in the present species.

The 5th leg (Text-fig. 46, G) very closely resembles that of the preceding species; but the spine-like setæ arising from both the inner and outer segments of the appendage are shorter and perhaps somewhat stouter.

It is possible that this male represents a small form of *J. investigatoris*, such as occur in several other species (*vide supra*, p. 121), but for the present and until more specimens are available for study I prefer to regard them as separate species.

DISTRIBUTION.—At present known only from the Maldive Archipelago.

The possession in the 1st leg of an endopod that is composed of only two segments, a very long proximal segment and a short distal segment, places these species in the same group as the following genera:

Dactylopodella Sars.
Flavia Brady.
Eudactylopus A. Scott.
Parastenhelia Thompson and A. Scott (= *Microthalestris* Sars).
Dactylopina Brady.
Dactylopodopsis Sars.
Peltthestris Monard.
Xouthous Thomson (= *Megarthrum* Norman and T. Scott).
Valentinia Norman and T. Scott.
Thalestrella Monard.
Tydemanella A. Scott.
Jalysus Brian.

Of these the possession of eight segments in the 1st antenna, and the presence of an exopod in the 2nd antenna that is composed of only a single segment, places the species in the same group with *Tydemanella* A. Scott and *Jalysus* Brian; but in *Tydemanella* the palp of the mandible is biramous, whereas in *Jalysus*, as in the present species, this palp is composed of a single unbranched rod.

In the genus *Jalysus*, however, the setal formula of the 2nd–4th legs is given by Gurney (1927*c*, p. 506) as follows :

	Endopod.			Exopod.			
	1.	2.	3.	1.	2.	3.	
P2	1	2	1, 2, 1	1	1	2, 1, 4	(2, 2, 3)
P3	1	2	3, 2, 1	1	1	3, 1, 4	(3, 2, 3)
P4	1	1	2, 2, 1	1	1	2, 1, 4	(2, 2, 3)

It may therefore be necessary in the future to erect a new genus for these two species ; but for the present I prefer to group them with *rufus* in the genus *Jalysus*.

Genus *Parawestwoodia* Sharpe (= *Westwoodia* Dana, *nom. preocc.*).

Closely related to the genus *Parawestwoodia* Sharpe are the genera *Pseudothalestris* Brady and *Pseudowestwoodia* Scott, and Sars (1903–11, p. 139) regards the last two as synonyms of *Westwoodia*. Monard (1928*a*, p. 358), apparently in ignorance of the fact that Sharpe (1910) had already pointed out that the name *Westwoodia* was preoccupied, proposed reducing these three genera to the rank of subgenera within the genus *Westwoodia* Dana (*sensu lato*). Both Gurney (1927*c*, p. 507) and Lang (1934, p. 32) are of the opinion that it is best to regard these three groups as definite genera and I have followed their suggestion.

Gurney (1927*c*, pp. 507–9) recorded two species of *Parawestwoodia* from the Suez Canal, namely *P. nobilis* (Baird) and *P. purpurea* Gurney.

Parawestwoodia nobilis (Baird).

Westwoodia nobilis, Sars, 1903–11, p. 140, pls. lxxxv, lxxxvi.
Westwoodia (*Westwoodia*) *nobilis*, Monard, 1928*a*, p. 359, figs. xxii, 1, and xxiii, 1.
Parawestwoodia nobilis, Gurney, 1927*c*, p. 507, fig. 134, A.

OCCURRENCE.—Addu Atoll, Maldive Archipelago, in weed-washings ; a single specimen.

DISTRIBUTION.—Maldive Archipelago (present record), Suez Canal (Gurney), Mediterranean Sea (Monard, Brian), coast of N. America, Wood's Hole region (Wilson), Irish coast (Farran), British Isles (Baird), English Channel (Norman and T. Scott, Monard), North Sea (Claus), the Baltic Sea (Klie), Kiel Bay (Kunz), the coast of Norway (Sars) and Franz Josef Land (Scott).

Genus *Pseudothalestris* Brady.

This genus is well represented in Indian waters, no less than four species having been recorded, namely *Pseudothalestris major* T. and A. Scott, from near Suez (A. Scott, 1902), *P. imbricata* Brady, from the Ceylon Pearl Banks (Thompson and A. Scott, 1903), *P. sarsi* A. Scott, from the Malay Archipelago (A. Scott, 1909), and *P. nana* T. Scott, from the Suez Canal, Port Taufiq (Gurney, 1927*c*).

Pseudothalestris imbricatu Brady. (Text-fig. 47, A–I.)

Pseudothalestris imbricata, Brady, 1883, p. 101, pl. xlii, figs. 1–8; Thompson and A. Scott, 1903, p. 272, pl. xi, figs. 19–24.
? *Pseudothalestris saturni*, Farran, 1913, p. 10, pl. i, figs. 1–4.
? *Westwoodia* (*Pseudothalestris*) *saturni*, Monard, 1928*a*, p. 362, figs. xxii, 4, and xxiii, 4.

Occurrence.—Addu Atoll, Maldive Archipelago, in weed-washings.

Descriptive Notes.—♀. Total length 0·74 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 47, A) are as 64 to 36. The cephalosome is large and bears a short rostrum, that is slightly emarginate on each side near the extreme tip, and from each emargination arises a very short and delicate hair. The proportional lengths of the segments of the posterior region of the body are as follows:

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
20	36	18	15	8	3 = 100

The anal segment bears a well-developed anal operculum with a semicircular posterior margin. The furcal rami are very short; the proportion of length to breadth being about 1 to 5. The 2nd furcal seta is swollen at the base.

The 1st antenna (Text-fig. 47, B) is short, and consists of six segments that have the following proportional lengths:

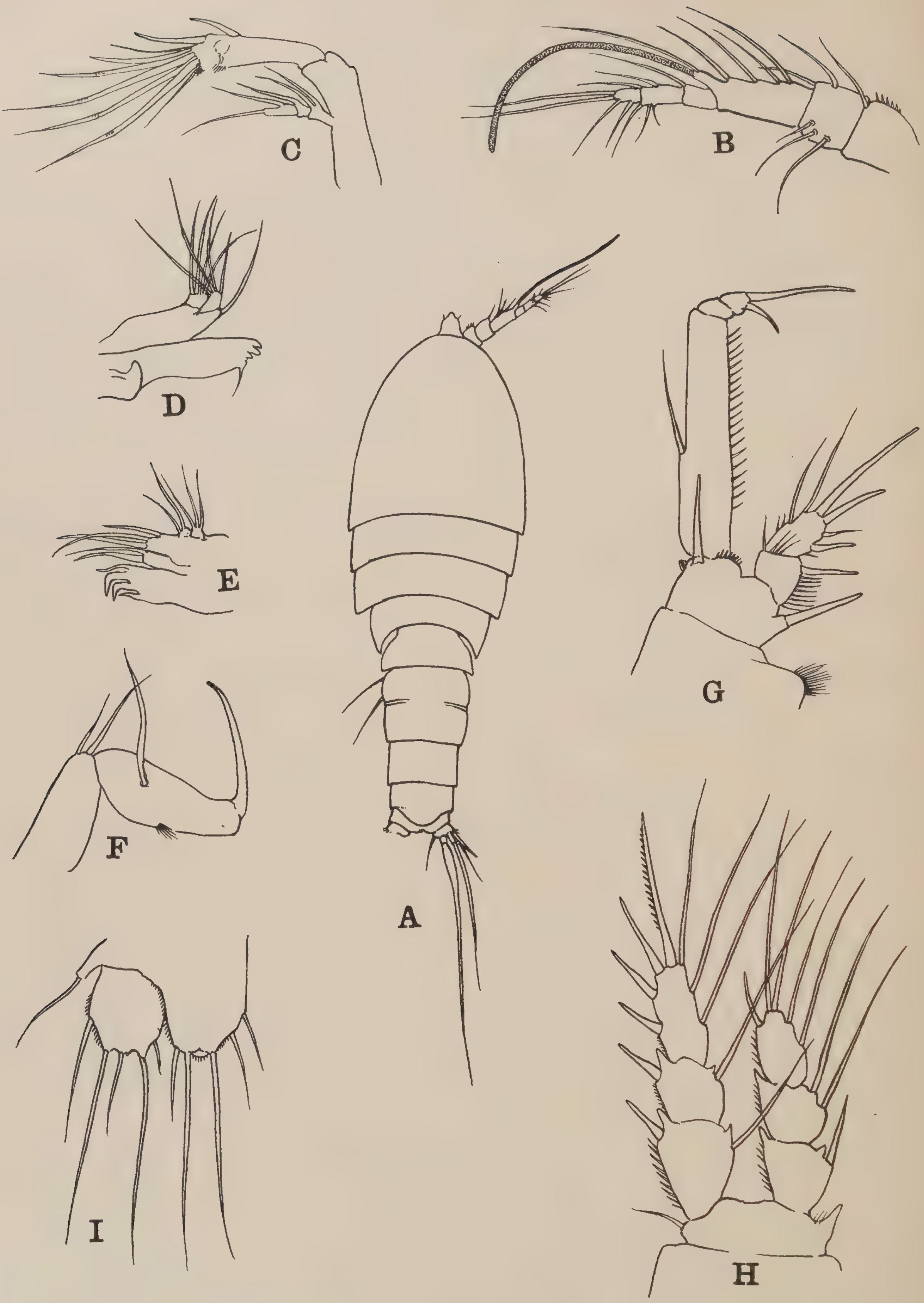
	Segment 1.	2.	3.	4.	5.	6.	
	15	18	35	10	15	7	= 100
imbricata, Thompson and A. Scott .	15	20	35	7	11·5	11·5	= 100
saturni, Farran	21	16	35	9	13	6	= 100

For comparison I have given above the corresponding measurements, calculated in parts per hundred of the total length, in *imbricata* as given by Thompson and A. Scott, and in *saturni* according to Farran. The line of division between segments 5 and 6 is not complete in some of my examples.

The 2nd antenna (Text-fig. 47, C) closely resembles that of *Parawestwoodia nobilis* (Baird) as figured by Sars (1903–11, pl. lxxxv, a^2); the terminal segment of the endopod is comparatively slender and bears on its anterior margin two spines, followed at the distal angle by a seta and a spine; on the distal margin arise four geniculate setæ, followed by a simple seta. The exopod is composed of three segments, bearing respectively two, one and two setæ; Monard, in his account of *P. saturni*, states (*loc. cit.*, p. 362) that the exopod "à 3 articles, armé de 5 soies", but in his figure (fig. xxii, 4) he shows three setæ arising from the distal segment, making six in all.

The mouth-parts closely resemble those of *Parawestwoodia nobilis* as figured by Sars.

In the 1st leg (Text-fig. 47, G) the 1st basal segment bears a tuft of hairs at the distal external angle. The 2nd basal segment is armed at both inner and outer distal angles with a tapering spine, that arising from the inner angle being somewhat the longer. The exopod is short, and reaches barely as far as the origin of the inner seta on the proximal segment of the endopod; it consists of two segments of approximately equal length. The 1st segment of the exopod bears a marginal spine, and a row of long hairs arises from the inner part of the distal margin; the 2nd segment bears on the outer margin first a spine, then a



Text-fig. 47.—*Pseudothalestris imbricata* Brady, ♀. A, Female, dorsal view. B, 1st antenna. C, 2nd antenna. D, Mandible. E, 1st maxilla. F, Maxilliped. G, 1st leg. H, 2nd leg. I, 5th leg.

delicate seta, and finally another spine at the distal outer angle; from the distal margin arise a long end-spine and a seta, and a second seta springs from the inner margin. In the seta-like character of the 2nd marginal spine these specimens agree exactly with the description of *saturni*, as given by Farran and Monard, but neither of these authors mentions any seta arising from the inner margin, as is shown in *imbricata* by Thompson and A. Scott. In the figure given by Thompson and A. Scott (1903, pl. xi, fig. 22) of this appendage in their examples of *imbricata* the delicate 2nd marginal seta appears to have been overlooked.

The 5th leg (Text-fig. 47, I) closely resembles the figure given by Thompson and A. Scott of this appendage (*loc. cit.*, pl. xi, fig. 23), and that of *saturni* as given by Farran (*loc. cit.*, pl. i, fig. 3) and Monard (*loc. cit.*, fig. xxiii, 4); in all cases the free segment bears five setæ, of which the middle one is much shorter than those on either side, and the innermost seta is also extremely short.

Farran, in his account of *P. saturni*, has commented on the resemblance between his examples and the account given by Thompson and A. Scott of the female of what they took to be *P. imbricata* Brady; he states that the differences between these two forms are:

(i) *P. saturni* is larger. Farran gives the length of his specimens as 0·8 mm.; those of *imbricata* measured by Thompson and Scott were only 0·65 mm. in length. The present examples, which measure 0·74 mm., are thus intermediate but approach more nearly to *saturni*.

(ii) In *P. saturni* there is a small additional outer edge seta on exopod 2 of the 1st leg, which is absent in *P. imbricata*. In my specimens this seta is present; they thus agree with *saturni*.

(iii) In *P. imbricata* there is an inner edge seta on the 2nd segment of the exopod of the 1st leg, which is absent in *saturni*. In these examples this seta is present; they thus resemble *imbricata*.

It thus appears probable that *P. saturni* Farran and the examples described by Thompson and A. Scott as the females of *P. imbricata* Brady are actually representatives of the same species that vary slightly, as one would expect from their wide geographical range. Whether Thompson and A. Scott are correct in assigning their examples to Brady's species cannot be determined, since Brady only had an example of the male and Thompson and A. Scott examples of the female.

DISTRIBUTION.—Kerguelen (Brady, ♂), Ceylon Pearl Banks (Thompson and A. Scott, ♀), Maldive Archipelago (present record, ♀), Mediterranean Sea (Monard, ♀), Irish Coast (Farran, ♀).

I can find no valid ground of distinction between the female *Pseudothalestris imbricata* Brady as described above and the male as described by Brady, and the form that has been described from the Mediterranean Sea, Gulf of Genoa and the Ægean Sea by Brian under the name *Westwoodia assimilis* var. *dubia* (1928*a*, p. 7, figs. 26–35) and *Westwoodia dubia* (1928*b*, p. 320). His description of the male agrees very closely with Brady's original description, with the exception that in the 2nd segment of the exopod of the 1st leg the inner seta is absent, as in *saturni* Farran, and the exopod of the 2nd antenna consists of three segments, whereas Brady in his original account states and figures it of only two segments.

Pseudothalestris minuta (Claus).

Westwoodia minuta, Sars, 1903–11, p. 142, pl. lxxxviii, fig. 1.
Westwoodia (*Pseudothalestris*) *minuta*, Monard, 1928*a*, p. 360, fig. xxii, 2, and xxiii, 2.
Pseudothalestris minuta, Wilson, 1932, p. 211, fig. 141.

Occurrence.—Addu Atoll, Maldive Archipelago, in weed-washings ; a single female.

According to Sars this species is identical with the form described by T. Scott under the name *Pseudothalestris major*.

Distribution.—Maldive Archipelago (present record), the Red Sea near Suez (A. Scott), the Mediterranean Sea (Monard, Brian), the coast of N. America, Wood's Hole region (Wilson), the Irish Coast (Farran), the British Isles (Brady, T. Scott), the North Sea, Heligoland (Claus), the coast of Norway (Sars).

Pseudothalestris nana T. Scott.

Pseudothalestris nana, T. Scott, 1914, p. 372 ; Gurney, 1927*c*, p. 509, fig. 135.
Pseudothalestris intermedia, T. Scott, 1912, p. 559, pl. ix, figs. 1–4, pl. xii, figs. 27–29.

Occurrence.—Addu Atoll, Maldive Archipelago, in weed-washings ; a single female.

Distribution.—Maldive Archipelago (present record), the Suez Canal, Port Taufiq (Gurney), S. Atlantic Ocean, Falkland Islands and S. Orkney Islands (T. Scott).

Family Diosaccidæ.

Genus *Diosaccus* Boeck.

Two species belonging to this genus were recorded by Gurney (1927*c*) from the Suez Canal, namely, *Diosaccus tenuicornis* (Claus) Sars and *D. truncatus* Gurney. One of these species, *D. truncatus* Gurney, occurs in the present collection, together with two others, *D. hamiltoni* (Thompson and A. Scott) and a new species for which I propose the name *D. monardi*.

Diosaccus truncatus Gurney.

Diosaccus truncatus, Gurney, 1927*c*, p. 513, fig. 136.

Occurrence.—Mergui Harbour, Burma, in a surface tow-netting. Burma coast 11° 34′ 45″ N. ; 98° 34′ 30″ E., in a surface tow-net. Several specimens of the female.

Descriptive Notes.—♀. Total length, 1·219 mm., slightly larger than the original specimens from the Suez Canal, which measured 1·12 mm. The proportional lengths of the anterior region, including the rostrum, and the posterior region are as 58 to 42. The proportional lengths of the segments of the posterior region are as follows :

Segment Abd. 1–2.	3.	4.	5.	Furca.	
47	18	14	16	5	= 100

The line of articulation between the furcal rami and the anal segment is armed laterally with a row of small spinules. Gurney describes the furcal rami as being apparently fused with the anal segment, but in the present specimens the separation was quite clear.

In the 1st antenna the eight segments have the proportional lengths as given below, and for convenience of reference I have also given the lengths as detailed by Gurney :

Segment	1.	2.	3.	4.	5.	6.	7.	8.
	23	23	16	15	4	7	4	8 = 100
(Gurney)	21	18	20	14	6	8	6	8 = 101

There thus appears to be some degree of variation in the length of individual segments, especially the 2nd and 3rd.

The mouth-parts and appendages agree closely with the description and figures given by Gurney, with the exception of the 4th swimming-leg. In this leg according to Gurney the 2nd segment of the endopod carries two inner setæ, but in the present examples only one was present, the setal formula for this leg being :

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P4	1	1	2, 2, 1	0	1	3, 2, 3 (or 3, 1, 4)

Distribution.—The coast of Southern Burma (present record) and Port Said (Gurney).

Diosaccus hamiltoni (Thompson and A. Scott). (Text-fig. 48, A–L.)

Dactylophusia hamiltoni, Thompson and A. Scott, 1903, p. 270, pl. x, figs. 1–7.

Occurrence.—Nankauri Harbour, Nicobar Islands, in coral-washings. Henry Lawrence Island, Ritchie's Archipelago, Andaman Islands, in weed.

Descriptive Notes.—♀. Total length, 1·09 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 48, A) are as 58 to 42. The rostrum is prominent and is sharply pointed. The proportional lengths of the segments of the posterior region of the body are as follows :

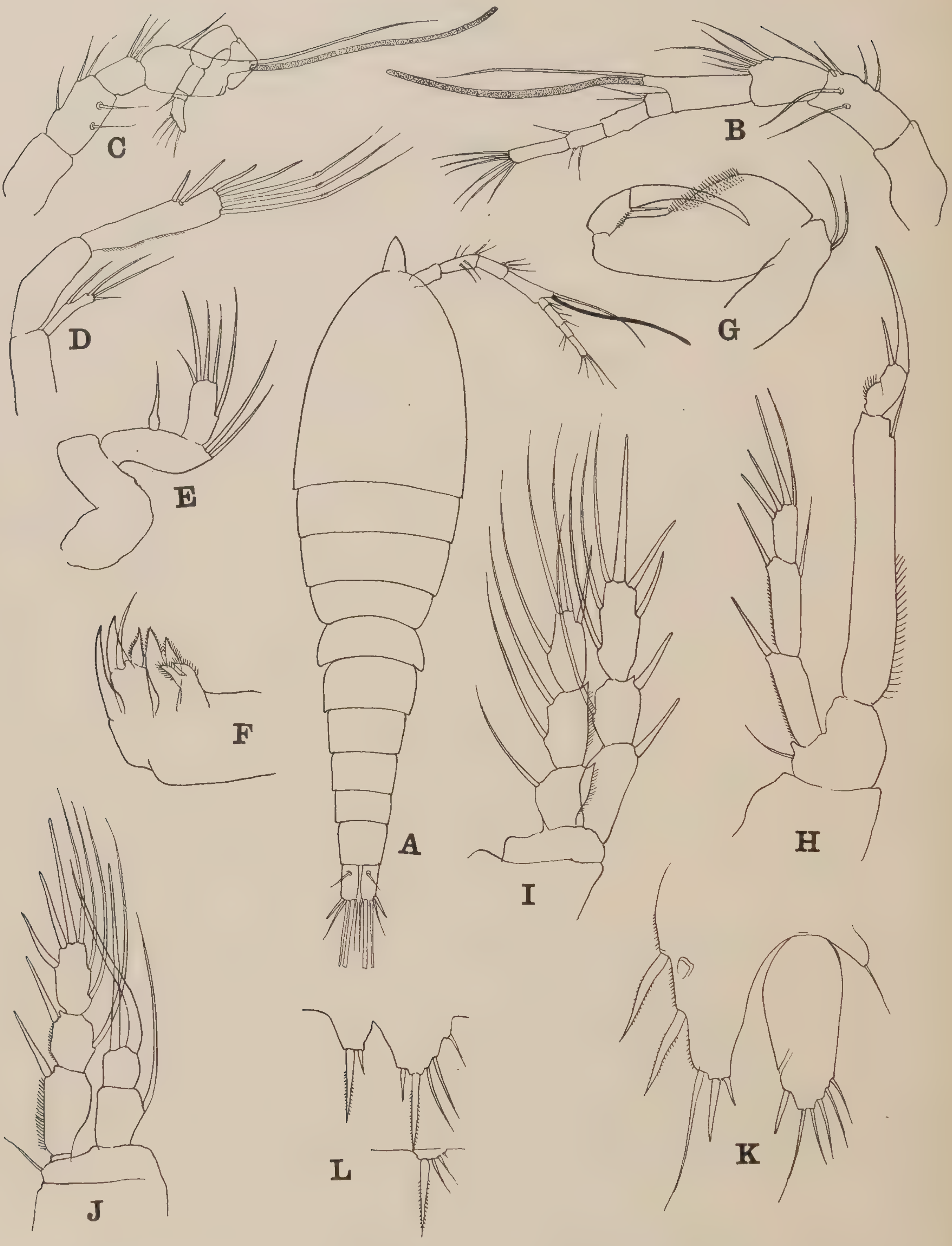
Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
13	28	15	12	18	14 = 100

The line of demarcation between the two parts of the genital segment, segments 1 and 2, is clearly visible across the dorsal aspect. The furcal rami are about twice as long as broad and are armed at the distal outer angle with a spine-like seta, that is not shown in Thompson and A. Scott's figure (pl. x, fig. 7).

The 1st antenna (Text-fig. 48, B) is long and reaches back to at least two-thirds the length of the cephalosome ; it consists of eight segments that have the proportional lengths given below ; for convenience I have also given the lengths from Thompson and A. Scott recalculated in parts per 100 :

Segment	1.	2.	3.	4.	5.	6.	7.	8.
	16	18	16	18	4	10	6	12 = 100
Thompson and A. Scott	18	18	15	17	5	9	6	11 = 99

In the 2nd antenna (Text-fig. 48, D) the exopod usually consists of only a single segment ; Thompson and A. Scott in their account of this appendage state that the



Text-fig. 48.—*Diosaccus hamiltoni* (Thompson and A. Scott). A, Female, dorsal view. B, 1st antenna, female. C, 1st antenna, male. D, 2nd antenna. E, Mandible. F, 2nd maxilla. G, Maxilliped. H, 1st leg. I, 2nd leg, female. J, 2nd leg, male. K, 5th leg, female. L, 5th leg and genital armature, male.

exopod is composed of two segments; they have, unfortunately, transposed the two rami, for they state, " outer branch of posterior antennæ 3-jointed, a 2-jointed inner branch springing from the basal joint ". In one of my examples the exopod was composed of two segments, but in this instance the line of segmentation fell beyond the origin of the 1st seta, so that the proximal segment carried one seta and the distal three; Thompson and A. Scott, in their figure (pl. x, fig. 3), show all four setæ arising from the distal segment.

The mandible (Text-fig. 48, E), like that of *D. tenuicornis*, possesses an expanded end that forms a crushing organ without any definite teeth. The palp possesses only a single ramus, the second ramus being represented by a single seta that is somewhat swollen at its base.

The 1st and 2nd maxillæ and the maxilliped (Text-fig. 48, F and G) closely resemble those of *D. tenuicornis*.

The 2nd–4th legs closely resemble those of *D. tenuicornis*, and the setal formula is as follows:

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P2	1	2	1, 2, 1	0	1	2, 2, 2
P3	1	2	2, 2, 1	0	1	3, 2, 3
P4	1	1	2, 2, 1	0	1	3, 2, 3

In the 5th pair of legs (Text-fig. 48, K) the distal free segment reaches a short distance beyond the level of the apex of the proximal inner segment and tapers slightly towards the end. It bears three delicate setæ on its outer margin close to the distal end, two setæ, of which the inner is the longer, on the distal margin, and one spine on the inner border. The proximal segment bears two unequal spines and a seta on the distal border and two sub-equal serrated spines on its inner margin. Close to the inner margin and near the origin of the proximal seta in the expansion of the proximal segment is a pit-like depression bordered with thickened chitin. Sars (1903–11, pl. lxxxix, p. 5) shows a similar structure in the inner margin of the proximal segment of *D. tenuicornis*, but makes no mention of it in the text.

♂. Total length, 0·8 mm.

The proportional lengths of the anterior and posterior regions of the body in this sex are as 58 to 42, as in the female. The proportional lengths of the segments of the posterior region are as follows:

Segment Th. 5.	Abd. 1.	2.	3.	4.	5.	Furca.
17	16	13	11	10	18	15 = 100

The furcal rami are slightly longer than in the female, and are more than twice as long as broad.

The 1st antenna (Text-fig. 48, C) forms a grasping organ.

The 1st leg resembles that of the female.

The 2nd leg (Text-fig. 48, J) is modified; the endopod consists of two segments only and the distal is much smaller than the proximal. The distal segment bears only two thickened setæ, that arise from the distal extremity; in *D. tenuicornis* this segment bears three setæ, of which two are modified.

As in *D. tenuicornis*, the 5th legs (Text-fig. 48, L) are not fully differentiated. The outer plate is about twice the size of the inner and is triangular in shape; it bears two delicate setæ on the outer aspect, a stout spine at the distal end, and a small seta on the inner margin. The inner plate bears a small spine externally and a stout serrated spine internally on its truncated extremity.

The genital segment bears an armature consisting of two delicate setæ and one large serrated spine, as in *D. tenuicornis*.

Distribution.—The Andaman and Nicobar Islands (present records) and the Ceylon Pearl Banks (Thompson and A. Scott).

Diosaccus monardi sp. nov. (Text-fig. 49, A–J.)

Occurrence.—Perseus Reef, Camorta Island, Nicobar Islands, in weed-washings.

Descriptive Notes.—♀. Total length, 0·85 mm.

The body (Text-fig. 49, A) is robust. The rostrum is depressed and terminates in a point. The line of demarcation between the cephalon and the 1st thoracic segment can be clearly traced across the dorsal aspect. The abdomen tapers markedly to the posterior end. The proportional lengths of the segments of the posterior region are as follows:

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
14	34	18	14	11	9 = 100

The furcal rami are about as long as broad, and the distal outer angle is truncated and is armed with a spine. The 2nd seta is as long as the whole posterior region and is markedly swollen and bulbous at the base.

The 1st antenna (Text-fig. 49, B) is composed of eight segments, that have the following proportional lengths:

Segment 1.	2.	3.	4.	5.	6.	7.	8.
17	19	19	20	4	7	6	8 = 100

The 4th segment bears a long, delicate sensory filament.

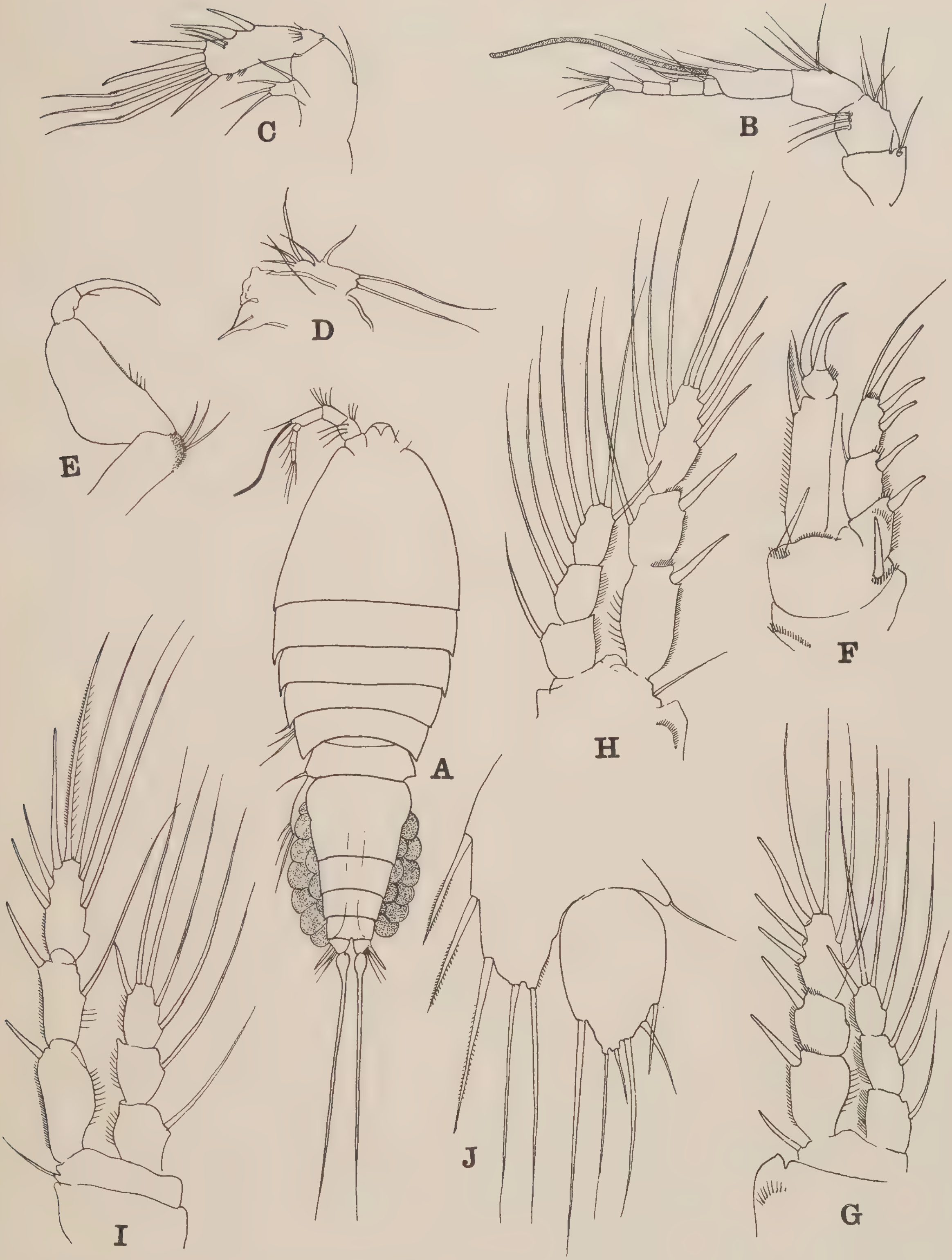
The 2nd antenna (Text-fig. 49, C) is robust and is composed of two segments, the distal of which bears on the anterior margin two spines followed by two delicate setæ; from the distal margin spring two stout spines followed by three geniculate setæ and then another spine. The exopod is composed of a single segment that bears four setæ.

The mandibular palp carries a single ramus, as in *D. tenuicornis*.

The 1st maxilla (Text-fig. 49, D) appears to be considerably reduced and bears a small palp.

The 2nd maxilla closely resembles that of *Dactylopusia thisboides* (Claus).

The 1st leg (Text-fig. 49, F) more nearly resembles that of a *Jalysus* (*cf. Jalysus investigatoris*, Text-fig. 44, H) than a *Diosaccus*. The 2nd basal segment bears a stout spine at both the inner and outer distal angles. The two rami are not markedly unequal in length. The exopod consists of three segments, of which the first bears only a marginal spine and is devoid of an inner seta; the outer margin is fringed with hair, and a curved row of needle-like spinules runs across the surface near the base of the marginal spine. The second segment bears both a marginal spine and an inner seta, and the outer border is fringed with hair; the terminal segment bears only two marginal spines, and from the distal end



Text-fig. 49.—*Diosaccus monardi* sp. nov., ♀. a, Female, dorsal view. b, 1st antenna. c, 2nd antenna. d, 1st maxilla. e, Maxilliped. f, 1st leg. g, 2nd leg. h, 3rd leg. i, 4th leg. j, 5th leg.

arise a long end-spine and a single seta. The endopod consists of only two segments, of which the proximal is equal in length to the whole exopod ; a short spine-like seta arises from the inner margin near the distal end. The terminal segment is globular, and bears two unequal, claw-like spines and a delicate inner seta.

The setal formula for the 2nd–4th legs (Text-fig. 49, G–I) is as follows :

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P2	1	2	1, 2, 1	0	1	2, 2, 3
P3	1	2	2, 2, 1	0	1	3, 2, 3
P4	1	1	2, 2, 1	0	1	3, 2, 3

This species thus differs from *D. tenuicornis*, *truncatus* and *hamiltoni* in having three marginal spines on the terminal segment of the exopod of the 2nd leg, instead of only two.

In the 5th leg (Text-fig. 49, J) the proximal inner segment extends to about half the length of the outer, free segment, and bears five setæ, of which the inner three are stout and spine-like, while two delicate setæ arise from the distal margin ; the distal free segment is somewhat pyriform in outline and tapers towards the apex, which bears six setæ.

The female bears two egg-sacs.

No corresponding male was seen.

I have much pleasure in dedicating this species to Dr. A. Monard.

DISTRIBUTION.—At present known only from the Nicobar Islands.

Genus *Amphiascus* Sars.

There has in the past been a considerable diversity of opinion regarding the strict limits of this large and unwieldy genus. Gurney (1927*c*) attempted to introduce some order by separating off a number of species in a new genus to which he gave the name *Amphiascopsis*, while others he transferred to the genus *Robertsonia* Brady and removed this genus from the family Tachidiidæ, to which it was referred by Sars, to the family Diosaccidæ. A year later Monard (1928*b*) reviewed the whole position, and he showed that the species of *Amphiascus* can be separated into thirteen groups, and that the species separated by Gurney in his genus *Amphiascopsis* fall into several different groups ; in the same paper he objected to the removal of *Amphiascus knoxi*, *irrasa* and *scotti* to the genus *Robertsonia* on the ground that in *Robertsonia* the females bear only a single egg-sac, whereas in *Amphiascus* and in these three species the number of egg-sacs is two. Another characteristic of the genus *Robertsonia* is the presence on the segments of the 1st antenna of certain serrated setæ ; such setæ are present in *Amphiascus knoxi*, *irrasa* and *scotti*, but are absent from the other species of *Amphiascus*. Gurney (1932) has again discussed this question, and he points out that the presence of one or two egg-sacs is not a character on which one can rely for the distinction between genera, since in certain species, *e. g.* *Nannopus palustris* and *Laophonte mohammed*, some examples show only one egg-sac while others have two ; I have myself examined a specimen of a female *Amphiascus ægyptius* Gurney in which there was only a single egg-sac instead of the usual two. Lang (1935*b*) has also questioned the importance that Monard attributed to the number of egg-sacs, and he further points out that the structure of the genital opening in the females of species of *Robertsonia* is essentially the same as that of *Amphiascus* and differs markedly from that of the genus *Tachidius*; he therefore concludes that Gurney is correct in referring the genus *Robertsonia* to the family Diosaccidæ, and in including in this genus the species that were formerly attributed to *Amphiascus*. Monard (1928*b*, p. 355) in his first work admits that these species, characterized by the reduction in the number of segments in the 1st antenna and the presence of serrated spines on some of the segments, might form a new genus or sub-genus, and he groups them together in what he terms the "bulbifer" group of *Amphiascus*; but in a later paper (1935) he has created a new genus, *Teissierella*, to which he refers two species discovered by him in the Mediterranean Sea, and he is of the opinion that to this new genus should be referred *Amphiascus bulbifer* Sars, *irrassus* (A. Scott) and *A. scotti* Sewell (=*Dactylopus propinquus* T. Scott).

In the following pages I have followed Monard.

THE "NASUTUS" GROUP, Monard, 1928*b*, p. 363.

In this group the various species possess the following characters: The 1st antenna is composed of nine segments. The exopod of the 2nd antenna usually possesses three segments, but in one species, *attenuatus* Sars, there are only two. The exopod of the 1st leg is shorter than the 1st segment of the endopod and the two terminal segments of the endopod are short. The 3rd segment of the 2nd–4th legs bears 7, 8 and 8 setæ and spines respectively, while the 3rd segment of the endopods bears 4, 5 and 5 setæ. The 2nd segment of the endopods bear 2, 2 and 1 setæ.

Amphiascus hirsutus (Thompson and A. Scott). (Text-fig. 50, A–J, ♀; Text-fig. 51, A–G, ♂.)

Dactylophusia hirsutus, Thompson and A. Scott, 1903, p. 269, pl. ix, figs. 19–24.
Amphiascus maldivensis, Wolfenden, 1906, p. 1031, pl. xcix, figs. 34–41.
Amphiascus hirsutus, A. Scott, 1909, p. 221; Monard, 1928, p. 373, fig. xxvi, 1.
Amphiascus hirsutus bermudas, Willey, 1931, p. 611, figs. 38–43; *id.*, 1935, p. 57, figs. 24–28.

OCCURRENCE.—Addu Atoll, Maldive Archipelago, in weed-washings; numerous examples of both sexes. Henry Lawrence Island, Andaman Islands, in coral-washings.

DESCRIPTIVE NOTES.—♀. Total length, 1·20–1·27 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 50, A) are as 59 to 41 or 56 to 44 in two specimens.

The rostrum is long, about one-fifth the length of the cephalic segment, and tapers to a sharp point; along either margin the chitin is thickened, except at a point at about two-thirds of the length, where a minute seta arises on each side. A pair of small cuticular lenses, to which Willey (1935, p. 57, fig. 25) has called attention, is present on the dorsal aspect of the cephalon behind the articulation of the 1st antenna.

The posterior region tapers slightly and the proportional lengths of the segments are as follows:

Segment	Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
	10	39	16	15	13	7 = 100

All the abdominal segments are decorated with rows of minute spinules. The furcal rami are broader than long in the proportion of 1·8 to 1. The 2nd furcal seta is the longest and is slightly swollen in its basal part.

The 1st antenna (Text-fig. 50, B) consists of nine segments, having the following proportional lengths :

Segment 1.	2.	3.	4.	5.	6.	7.	8.	9.
26	17	8	15	6	8	5	5	10 = 100

Monard (1928, p. 364) in his key to the species of the "Nasutus" group separates *A. maldivensis* Wolfenden and *A. banyulensis* Monard from *A. hirsutus* (Thompson and A. Scott) by the length of the terminal part of the 1st antenna ; he gives as a character of *A. hirsutus*, "Fouet de A 1 plus long que les deux articles précédents", and for *A. maldivensis*, "Fouet de A 1 égal aux deux articles précedénts". Thompson and A. Scott (*loc. cit.*, p. 269) have given the proportional lengths of the antennal segments in their examples, and these, recalculated as parts per 100, are 20, 20, 10, 15, 4, 7, 6, 4, 13 ; the proportional lengths of the terminal part of the antenna, consisting of five segments, and the preceding two segments are as 34 to 25, or in the present examples as 34 to 23. Wolfenden unfortunately gives no measurements for the antennal segments in the form that he named *A. maldivensis*, but his figure (*loc. cit.*, 1906, pl. xcix, fig. 38) clearly shows that the terminal part of the antenna is considerably longer than the preceding two segments in the proportion of 34 to 26. It is thus clear that this distinction is invalid.

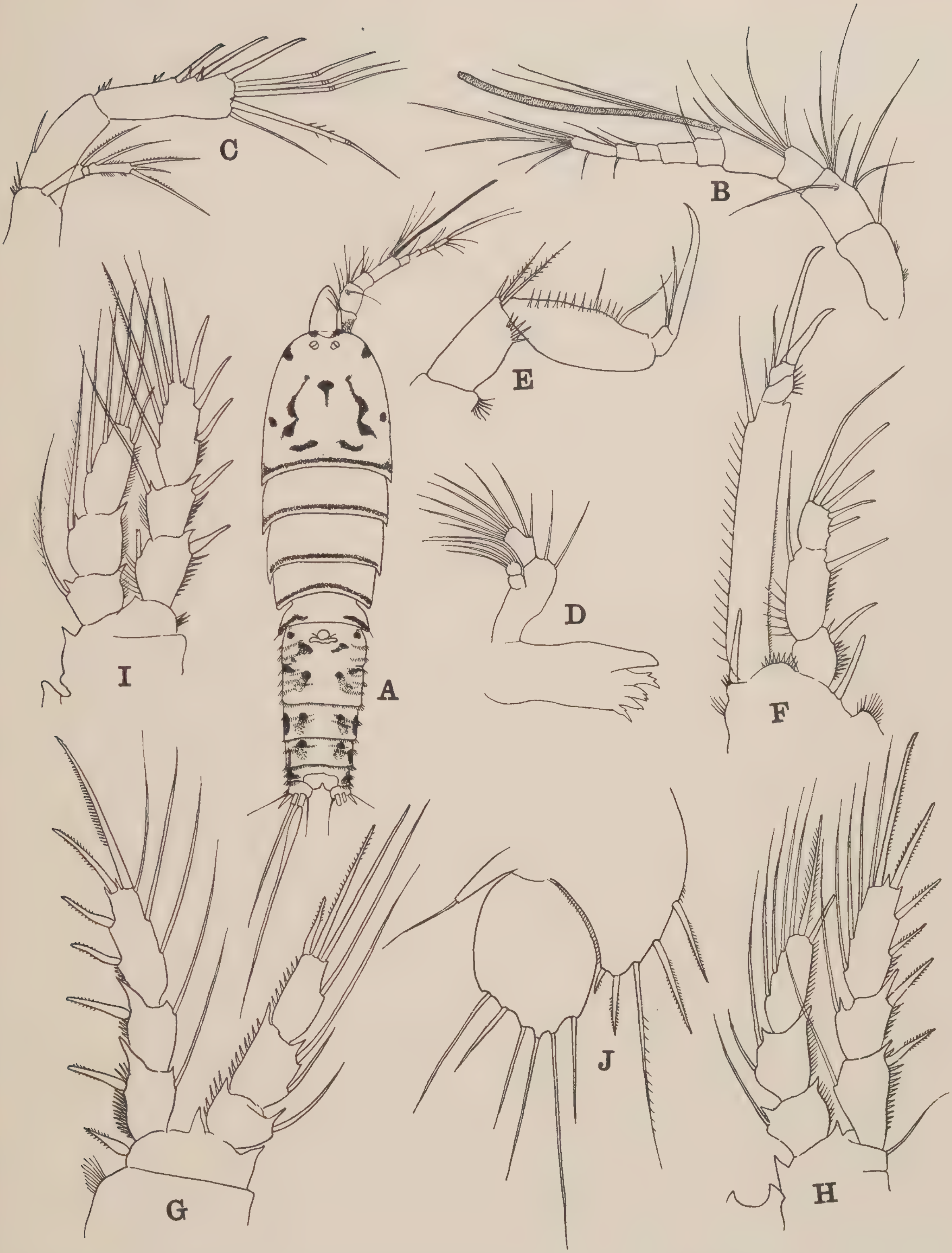
The 2nd antenna (Text-fig. 50, C) consists of three segments, of which the distal bears three spines, four geniculate setæ and one straight seta. The exopod is composed of three segments, of which the basal is long and bears one seta distally, the second is very small and is devoid of a seta, and the third is again long and bears one seta on the anterior margin near the base and three at the distal end. Thompson and A. Scott figure this branch as having a seta on the small middle segment ; Wolfenden states that in *A. maldivensis* the "basal with one long distal marginal spine, last joint with three terminal bristles", but in his figure (pl. xcix, fig. 40) he shows a seta arising from the distal end of the proximal segment, a seta springing from the small middle segment, but none from the base of the terminal segment.

The mandible (Text-fig. 50, D) is strong and is armed with a number of teeth ; the palp, according to Monard, is composed of only a single ramus, but this is, I think, incorrect ; in the present examples there are two distinct rami, the 1st or inner composed of a single segment, and the 2nd or outer smaller and apparently composed of two short segments.

The 2nd maxilla, as Willey (1931, p. 611) has pointed out in his description of the Bermuda form, possesses four lobes proximal to the unguiferous lobe, as a result of the deep subdivision of the 1st or proximal lobe. Willey states that this character seems to be unique in the genus, and Wolfenden in his account of *A. maldivensis* describes this appendage as having "setigerous lobes and one hook bristle on the 5th (?)".

The maxilliped (Text-fig. 50, E) has a somewhat slender "hand", the anterior margin of which is fringed with a row of small needle-like spinules. The end claw bears two setæ.

In the 1st leg (Text-fig. 50, F) both rami are three-jointed. The 2nd basal segment bears a spine at both the inner and outer distal angles, and a row of spinules runs along the free margin between the articulations of the rami. The exopod is about two-thirds the length of the 1st segment of the endopod, and both the 1st and 2nd segments are fringed along their outer margins with a row of spinules. The distal segment bears four spines



TEXT-FIG. 50.—*Amphiascus hirsutus* (Thompson and A. Scott), ♀. A, Female, dorsal view. B, 1st antenna. C, 2nd antenna. D, Mandible. E, Maxilliped. F, 1st leg. G, 2nd leg. H, 3rd leg. I, 4th leg. J, 5th leg.

and one seta. The 2nd and 3rd segments of the endopod are clearly separated, and the distal segment bears two stout claws and a single delicate seta.

In the 2nd–4th legs (Text-fig. 50, G, H and I) the setal formula is identical with that of *A. cinctus* (Claus), as follows :

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P2	1	2	1, 2, 1	1	1	2, 2, 3
P3	1	2	3, 2, 1	1	1	3, 2, 3
P4	1	1	2, 2, 1	1	1	3, 2, 3

The 2nd seta on the terminal segment of the endopod of the 4th leg is somewhat modified and is serrated.

In his account of *A. maldivensis* Wolfenden states that in the 2nd leg " end. 3 square at end, with one marginal and four apical setæ and one long rather broad spine at outer angle " ; he, however, figures it as possessing one seta on the inner margin, two at the apex and one spine at the distal outer angle, thus agreeing with the formula given above.

In the 5th leg (Text-fig. 50, J) the proximal segment is wide and the inner margin is curved ; it bears two serrated spines and one seta on the inner border and two markedly unequal serrated spines, the outer being the shorter, at the distal end. The 2nd free segment is broadly oval, slightly emarginate in the distal outer portion ; it is about one-and-a-half times as long as broad and bears six setæ ; the present examples agree closely with the figure of the appendage in *A. maldivensis*, as given by Wolfenden (1906, pl. xcix, fig. 37).

The body is dotted over with a number of spots and streaks, as indicated in the figure, of a purple-black colour.

♂. Total length, 0·82–0·90 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 51, A) are as 60 to 40 or 62 to 38. The segments of the posterior region have the following proportional lengths :

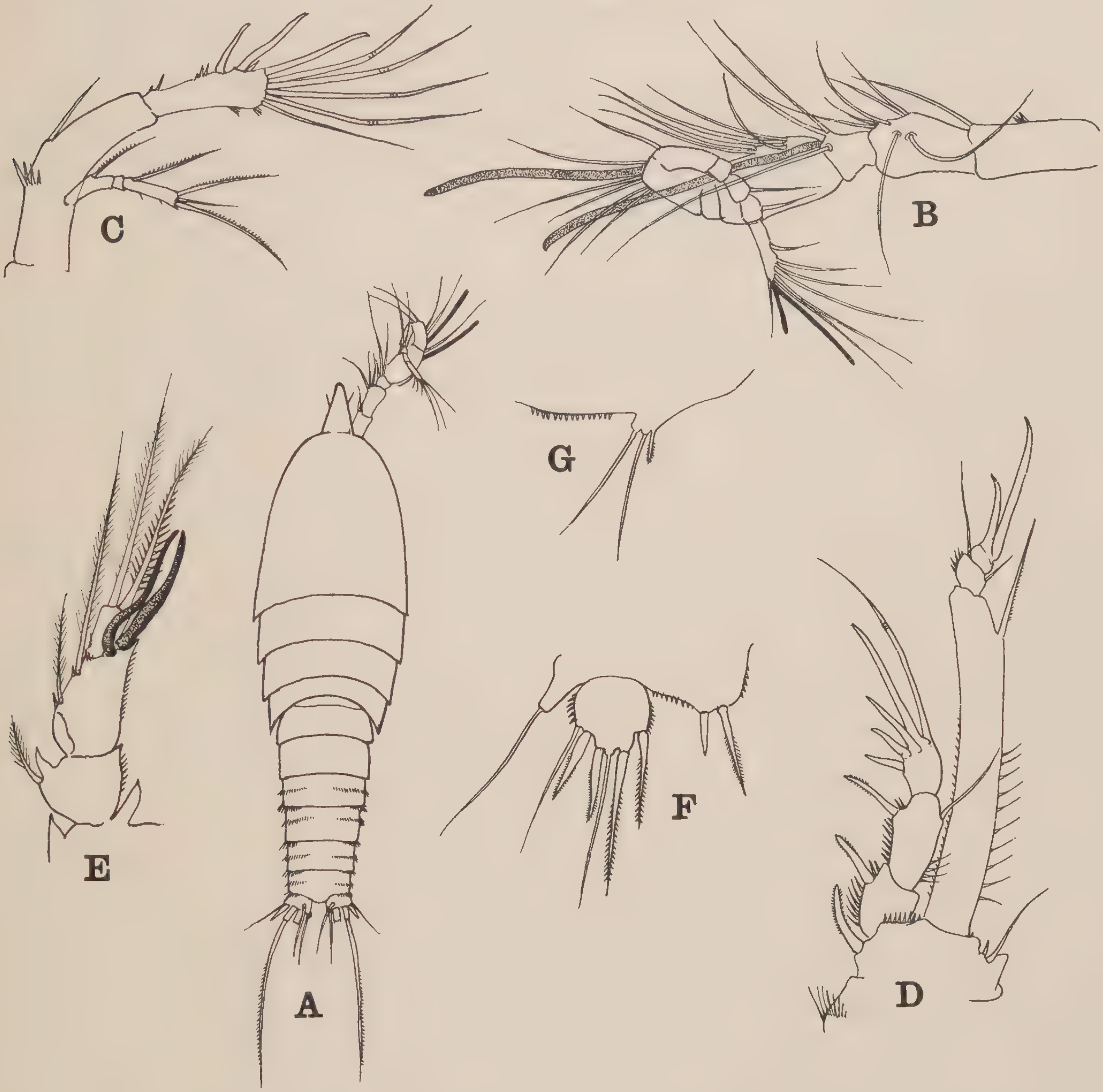
Segment Th. 5.	Abd. 1.	2.	3.	4.	5.	Furca.
15	24	15	13	13	13	7 = 100

As in the female, the abdominal segments are ornamented with rows of minute spinules and the basal part of the 2nd furcal seta is somewhat swollen.

In the 1st leg (Text-fig. 51, D) the 2nd basal segment bears a stout serrated spine at the distal outer angle, but at the distal inner angle the inner border is modified into a blunt short process, immediately distal to which springs a delicate seta and a small spine. The exopod appears to be relatively somewhat shorter than in the female.

In the 2nd leg the endopod (Text-fig. 51, E) is composed of two segments only ; the proximal segment bears one seta on its inner margin, and immediately distal to this the border is produced in a spine-like process ; the distal segment bears two setæ on its inner border, the proximal being considerably the shorter, and two setæ distally, of which the outer is thickened and serrated along two-thirds of its length. At about two-thirds the length of the combined segment two modified setæ arise, and beyond the point of their origin the width of the segment narrows appreciably.

In the 5th leg (Text-fig. 51, F) the inner part of the basal segment is but little produced and bears two unequal spines. The distal free segment is sub-circular, being as broad as long; from the inner margin arise two unequal serrated spines, the distal being one-and-a-half times the length of the proximal; from the extreme apex springs a delicate seta, and from the outer margin arise two subequal serrated spines and a delicate seta. Both inner and outer borders are armed with small spinules.



TEXT-FIG. 51.—*Amphiascus hirsutus* (Thompson and A. Scott). A, Male, dorsal view. B, 1st antenna. C, 2nd antenna. D, 1st leg. E, Endopod of 2nd leg. F, 5th leg. G, Genital armature.

DISTRIBUTION.—If I am correct in my view that *A. hirsutus* and *A. maldivensis* are identical, this species has now been recorded from the Malay Archipelago (A. Scott), the Andaman Islands (present record), the Ceylon Pearl Banks (Thompson and A. Scott), the Maldive Archipelago (Wolfenden and the present record), the Mediterranean Sea (Monard) and the coast of Bermuda (Willey).

Amphiascus nicobaricus sp. nov. (Text-fig. 52, A–H, ♀; Text-fig. 53, A–G, ♂.)

OCCURRENCE.—Nankauri Harbour, Nicobar Islands, in weed-washings. Addu Atoll, Maldive Archipelago, in weed-washings; several examples of both sexes, some of the females ovigerous.

DESCRIPTIVE NOTES.—This species presents a very close degree of resemblance to the preceding species, differing only in size and in small details of structure.

♀. Total length, 0·90–1·04 mm.

The proportional lengths of the anterior region, including the rostrum, and the posterior region of the body (Text-fig. 52, A) are as 55 to 45 or 59 to 41. The rostrum is a little less than one-fifth the length of the whole anterior region. The segments of the posterior region have the following proportional lengths:

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
14	35	14	12	17	8 = 100

All the abdominal segments are armed with transverse rows of small spinules. The furcal rami are broader than long in the proportion of 1·9 to 1, and the 2nd furcal seta is long, nearly as long as the whole body, and is thickened in a spindle-shaped swelling at the base.

The 1st antenna consists of nine segments that have the following proportional lengths:

Segment 1.	2.	3.	4.	5.	6.	7.	8.	9.
23	18	9	18	6	7	5	4	10 = 100

The proportional lengths of the terminal 5-segmented region and the two preceding segments are as 32 to 27.

The 2nd antenna (Text-fig. 52, C) is composed of two segments, of which the proximal bears a row of needle-like spinules near the base; and the distal segment bears three spines, four geniculate setæ and a straight, simple seta. The exopod consists of three segments, of which the middle one is very short; the proximal segment bears one seta at the distal angle, the 2nd segment is entirely devoid of any seta, and the terminal segment bears one seta near the base and three at the distal end.

The mandible (Text-fig. 53, B) is strongly built and is provided with a number of strong teeth; the palp possesses two single-jointed rami.

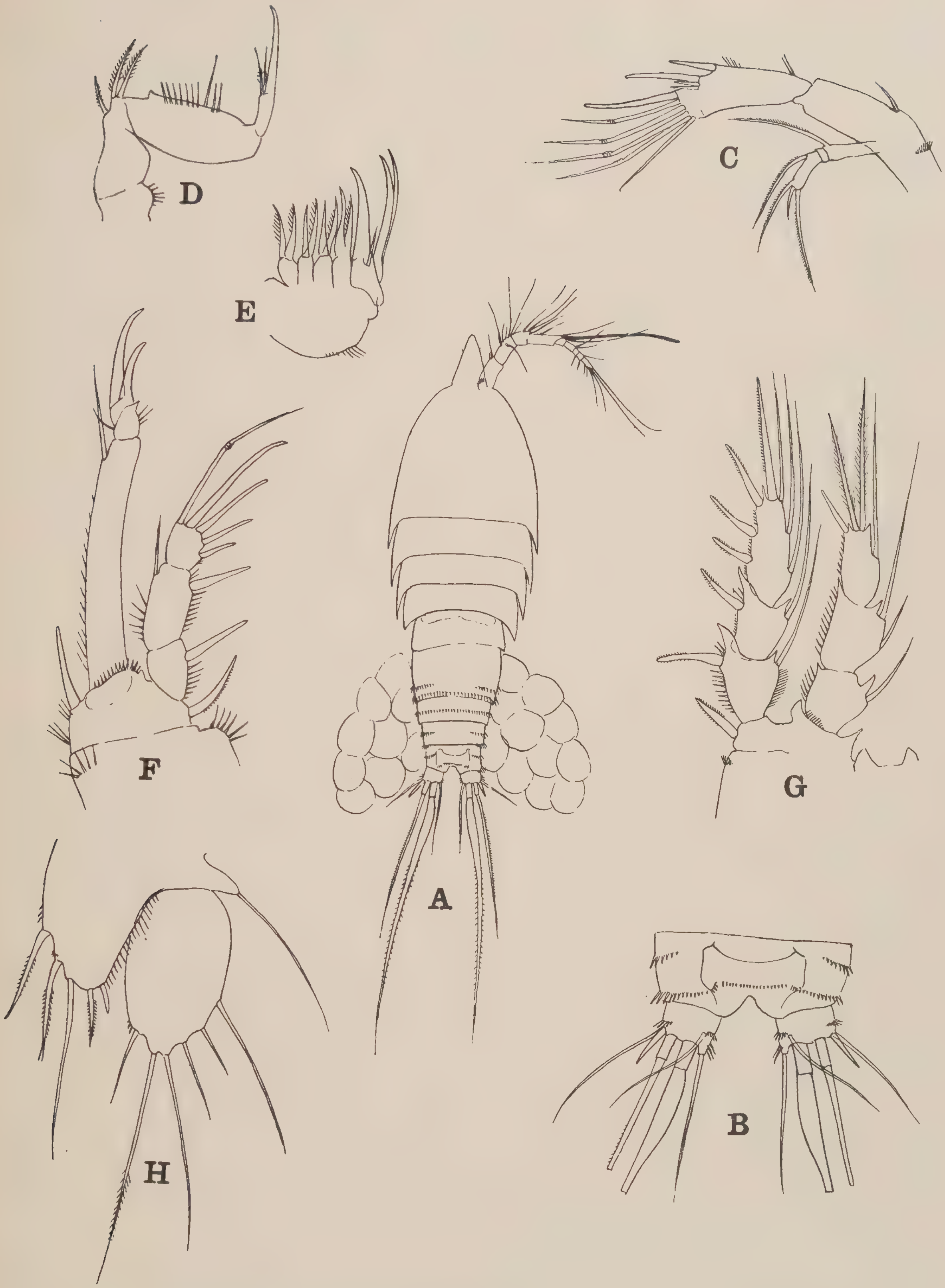
The 2nd maxilla (Text-fig. 52, D) is, as in the preceding species, furnished with five lobes, of which the distal bears two strong claws and the others each bear two stout setæ.

The maxilliped (Text-fig. 52, E) possesses a somewhat slender "hand", that is fringed with needle-like spines along the proximal half of the anterior border.

In the 1st leg (Text-fig. 52, F) the 2nd basal segment bears a short spine at both the inner and outer distal angles, and the distal margin is armed with a row of spinules. The two rami are each composed of three segments. The exopod reaches to about two-thirds the length of the proximal segment of the endopod.

The setal formula of the 2nd–4th legs appears to be as follows:

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P2	1	2	1, 2, 1	1	1	2, 2, 3
P3	1	2	3, 2, 1	1	1	3, 2, 3
P4	1	1	2, 2, 1	1	1	2, 2, 3



TEXT-FIG. 52.—*Amphiascus nicobaricus* sp. nov. A, Female, dorsal view. B, Anal segment and furca, female. C, 2nd antenna. D, 2nd maxilla. E, Maxilliped. F, 1st leg. G, 2nd leg. H, 5th leg.

Unfortunately, when the female example was dissected, by an oversight no note was made of the number of setæ arising from the inner margin of the 3rd segment of the exopod of the 4th leg; in the male, however, this segment carried only two setæ on the inner margin.

In the 5th leg (Text-fig. 52, H) the proximal segment is slightly bowed on the inner margin, and the process extends to about half the length of the distal segment or slightly further; it bears five setæ, of which three, the proximal two being spine-like and the distal a long simple seta, are on the inner margin and two unequal setæ on the distal border; the outer border is fringed with hairs. The distal segment is an elongate oval, being about one and three-quarters as long as wide; it closely resembles the appendage in *A. banyulensis* Monard (1928, p. 375, fig. xxvi, 2). This free segment bears six setæ, of which three arise from the outer margin, the first being long and the next two short; two are situated distally and both are long, and one short seta on the inner margin.

This form is marked with a number of yellow spots and bands, that as regards position are very similar to the markings of the preceding species.

♂. Total length, 0·66 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 53, A) are as 59 to 41. The segments of the posterior region have the following proportional lengths:

Segment Th. 5.	Abd. 1.	2.	3.	4.	5.	Furca.
12	23	17	15	13	12	8 = 100

The furcal rami are nearly twice as broad as long, and in this sex the 2nd furcal seta is not swollen at the base.

The 1st antenna forms the usual grasping-organ.

The 2nd antenna is composed of two segments, and of these the proximal is very long and on its anterior and inner aspect shows signs of division. The distal segment of the endopod bears three spines, four geniculate setæ and one simple seta. The exopod is composed of three segments, of which the proximal bears one seta at the distal angle, the 2nd is very small and has no seta, and the 3rd is again long and bears a single seta near the base and three distally. In one specimen the distal segment carried an additional seta near the base.

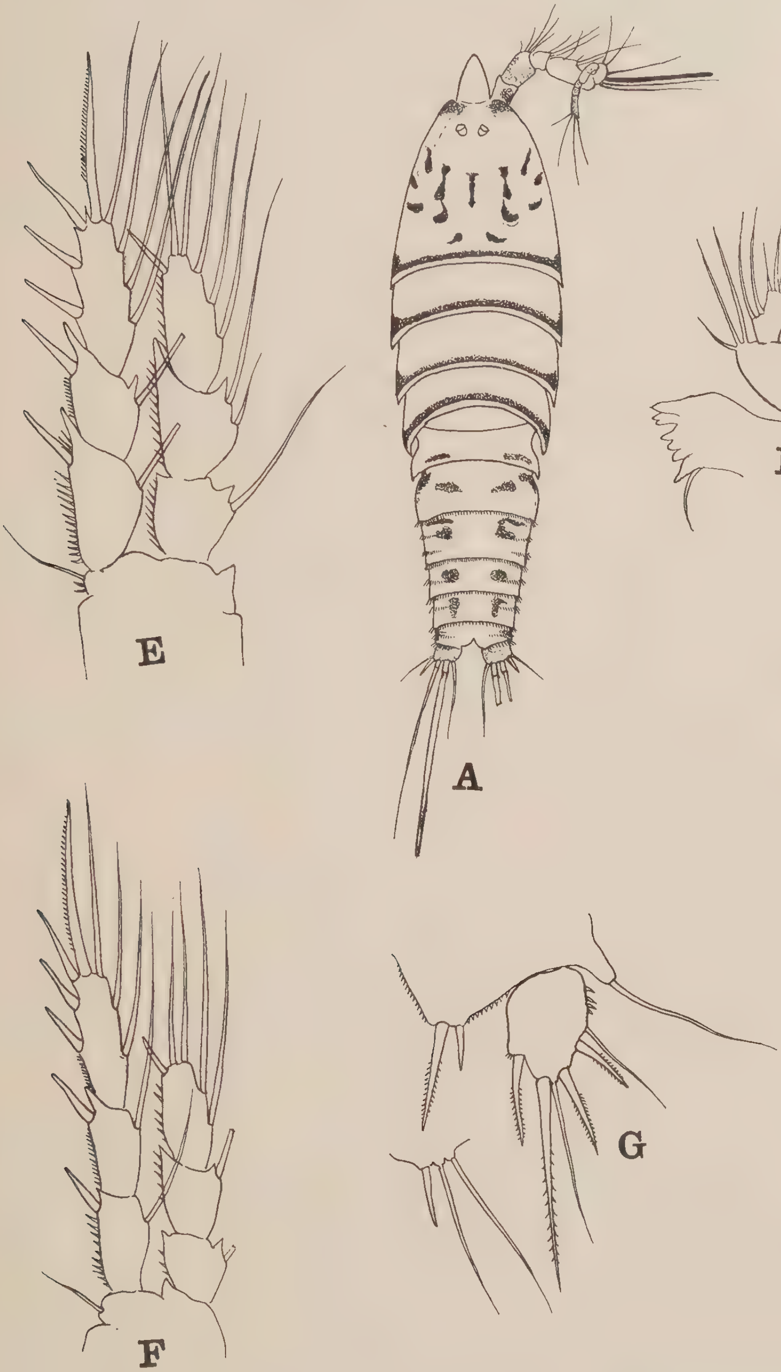
The mouth-parts are as in the female.

In the 1st leg (Text-fig. 53, C) the inner distal region of the 2nd basal segment is, as in the preceding species, produced in a short pointed process, on the outer side of which arise a delicate seta and a short blunt spine; a strong curved spine springs from the distal outer angle.

In the 2nd leg (Text-fig. 53, D) the endopod is modified and is composed of only two segments, the 2nd and 3rd being fused; the distal segment bears two modified spines on the outer margin, and two setæ, the outer of which is modified and serrated, on the distal border. I have been unable to detect any real difference between this appendage in the present form and in the preceding species.

In the 5th leg (Text-fig. 53, G) the basal segment is slightly produced in a triangular prominence, from the apex of which arise two unequal spines, the outer much the smaller; the margin of the process is fringed with spinules. The distal segment is about one and a third times as long as broad; it is thus considerably longer than in the preceding species. It bears on its outer margin one delicate seta proximally and two subequal serrated spines;

from the apex arise a delicate seta externally and a very long serrated spine internally, and from the inner margin arises one serrated spine. The long apical serrated spine is much longer in this form than in the preceding species.



TEXT-FIG. 53.—*Amphiascus nicobaricus* sp. nov. A, Male, dorsal view. B, Mandible. C, 1st leg. D, 2nd leg. E, 3rd leg. F, 4th leg. G, 5th leg and genital armature.

The border of the genital segment (Text-fig. 53, G) is armed with one spine and two setæ.

DISTRIBUTION.—At present known only from the Nicobar Islands and the Maldive Archipelago.

This species very closely resembles *Amphiascus banyulensis* Monard (1928*a*, p. 375), and it is possible that they are varieties of one species. There are, however, certain differences, namely: (1) *Amphiascus banyulensis* is devoid of any ornamentation on the segments of the body, whereas *A. nicobaricus* is armed with rows of spinules on the abdominal segments. (2) In *A. banyulensis* the crochet of the maxilliped bears a single accessory seta, whereas in *A. nicobaricus* there are two. (3) The apical segments of the exopods of the 2nd–4th legs bear 7, 8 and 8 setæ and spines in *A. banyulensis*, and 7, 8 and 7 in *A. nicobaricus*.

It thus seems to me to be preferable for the present to regard them as separate, though very closely related species.

The "Cinctus" Group, Monard, 1928*b*, p. 368.

This group includes robust forms, in which the structure of the 1st leg resembles that of *Dactylopusia*, the endopod being much longer than the exopod and the terminal two segments being short and more or less fused together. The 1st antenna is composed of eight segments. The exopod of the 2nd antenna has three segments. The 2nd segments of the 2nd to 4th legs bear 2, 2 and 1 setæ respectively. The 3rd segments of the exopod of the 2nd to 4th legs, according to Monard, bear 7, 8 and 8 setæ and spines, and the 3rd segment of the endopods of these legs 4, 6 and 5 setæ; while this is certainly true for the great majority of species assigned to the "*Cinctus*" group, one of the species taken in Indian waters (*A. rebus* sp. nov.) differs in that the terminal segment of the 3rd leg has only five setæ, as in the 4th leg. The 5th leg is large and well formed, and the distal free segment bears six, but occasionally seven, setæ. The furcal rami are short and the furcal setæ in most species are not modified.

Amphiascus cinctus (Claus). (Text-fig. 54, A–E, ♀; Text-fig. 55, A–J, ♂.)

Amphiascus cinctus, Sars, 1903–11, p. 149, pls. xci, xcii.
Dactylophusia ceylonica, Thompson and A. Scott, 1903, p. 269, pl. ix, figs. 25–32.
Amphiascopsis cinctus, Gurney, 1927*c*, p. 516, fig. 137.
Amphiascus cinctus, Monard, 1928*a*, p. 382, fig. xxix, 3; Wilson, 1932, p. 221, fig. 149*a–d*; Willey, 1935, p. 52, figs. 2, 3, and 6–16.

As Monard (1928*a*, p. 382 *et seq.*) has pointed out, several species in this group are closely related to *Amphiascus cinctus* Claus, and within the limit of a species, individuals appear to be very variable. Thompson and A. Scott (1903, p. 269, pl. ix, figs. 25–32), under the name *Dactylopusia ceylonica*, briefly described and figured both sexes of a form that is very closely related to, if not identical with, *A. cinctus*, and Gurney (1927*c*, p. 516) obtained the same form at Port Said; Gurney notes that the females "agree exactly with Prof. Sars' description of the female" of *A. cinctus*, but he recognizes that the male is slightly different.

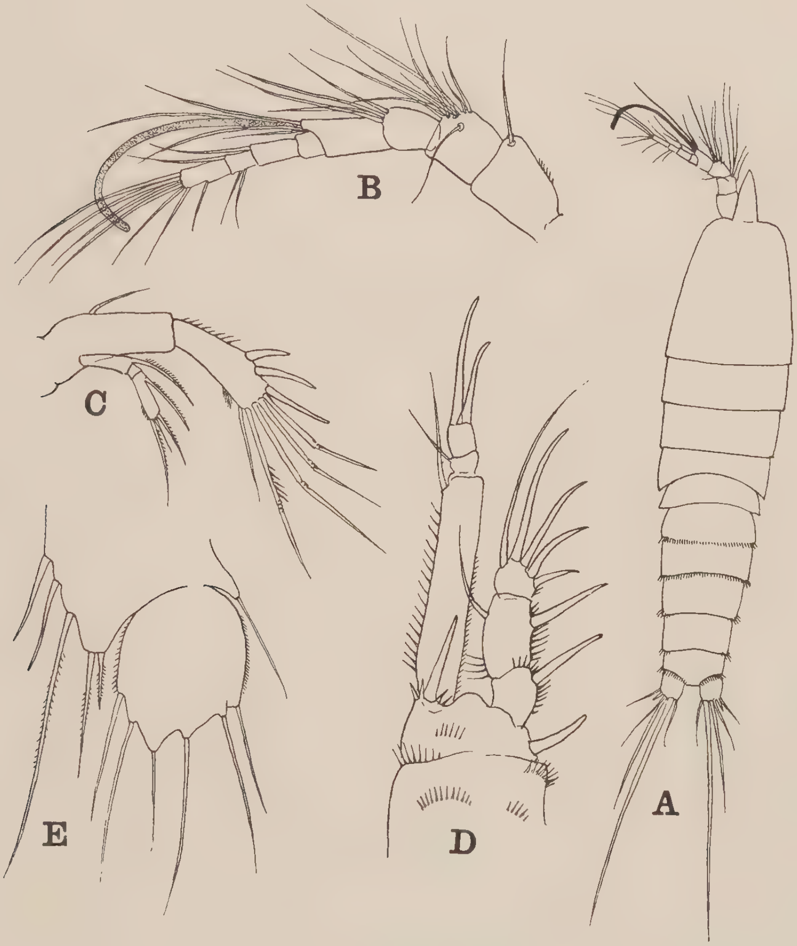
Willey has obtained this species off Bermuda and in his specimens has recognized several different forms, to which he has given names, that in his view are different stages in the development, namely, an immature form before the final ecdysis, a sub-mature form, prior to fertilization by the male, and a fully mature form, when the ova are extruded.

Occurrence.—Nankauri Harbour, Nicobar Islands, in weed-washings.

Descriptive Notes.—♀. Total length, 0·97 mm. This is somewhat larger than the measurements given by Sars, 0·84 mm., or by Monard, 0·52, 0·8 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 54, A) are as 6 to 4. The rostrum is very long, measuring nearly one-fifth of the length of the whole anterior region and reaching beyond the distal end of the 2nd antennular segment. The proportional lengths of the segments of the posterior region are as follows :

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
12	35	16	16	12	9 = 100



Text-fig. 54.—*Amphiascus cinctus* (Claus). A, Female, dorsal view. B, 1st antenna. C, 2nd antenna. D, 1st leg. E, 5th leg.

The genital region appears to consist of two separate segments ; each of these has a ring of fine spinules along its posterior margin. The 3rd and 4th segments are also armed with fine spinules along their posterior margins ventrally, and a row of small spinules fringes the dorsal margin of the articulation of the furcal rami.

The proportional lengths of the segments of the 1st antenna (Text-fig. 54, B) are as follows :

Segment 1.	2.	3.	4.	5.	6.	7.	8.
29	14	13	11	8	10	6	9 = 100

In the 2nd antenna (Text-fig. 54, c) I was unable to detect any seta arising from the small 2nd segment of the exopod; in this respect these examples differ from the typical form, as described by Sars and Monard, but agree with the form *fissipes* obtained by Willey from Bermuda. These examples differ from the type in having only three spines on the distal segment of the endopod instead of four (*vide* Sars, pl. xci, a^2).

The mouth-parts and swimming-legs agree closely with those of the typical form.

In the 5th leg (Text-fig. 54, E) the distal segment differs slightly from the typical form, in that the two proximal setæ on the outer margin arise close together; in this respect these specimens approximate to the condition found in f. *fissipes* Willey.

♂. Total length, 0·66 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 55, A) are as 61 to 39. The proportional lengths of the segments of the posterior region are as follows:

Segment Th. 5.	Abd. 1.	2.	3.	4.	5.	Furca.
11	16	15	20	20	10	8 = 100

Segments 1–4 are armed with a ring of needle-like spinules around the ventral and lateral aspects, but interrupted in the mid-dorsal line. The 5th segment is also armed with a row of small spinules along the articulation of the furcal rami. The furcal rami are one-and-a-half times as broad as long, and the outer distal angle is furnished with a delicate spine.

The 1st antenna forms the usual grasping organ.

The 2nd antenna (Text-fig. 55, B) is stoutly built and consists of two segments. The distal segment, as in the female, bears three spines instead of four, and three geniculate setæ. The exopod is distinctly shorter than in *A. cinctus* and the short middle joint of the exopod is without a seta.

In the 1st leg (Text-fig. 55, D) the spine that arises from the distal inner angle of the 2nd basal segment is very much longer than in *A. cinctus* as figured by Sars (1903–11, pl. xcii), and reaches to the end of the proximal segment of the endopod.

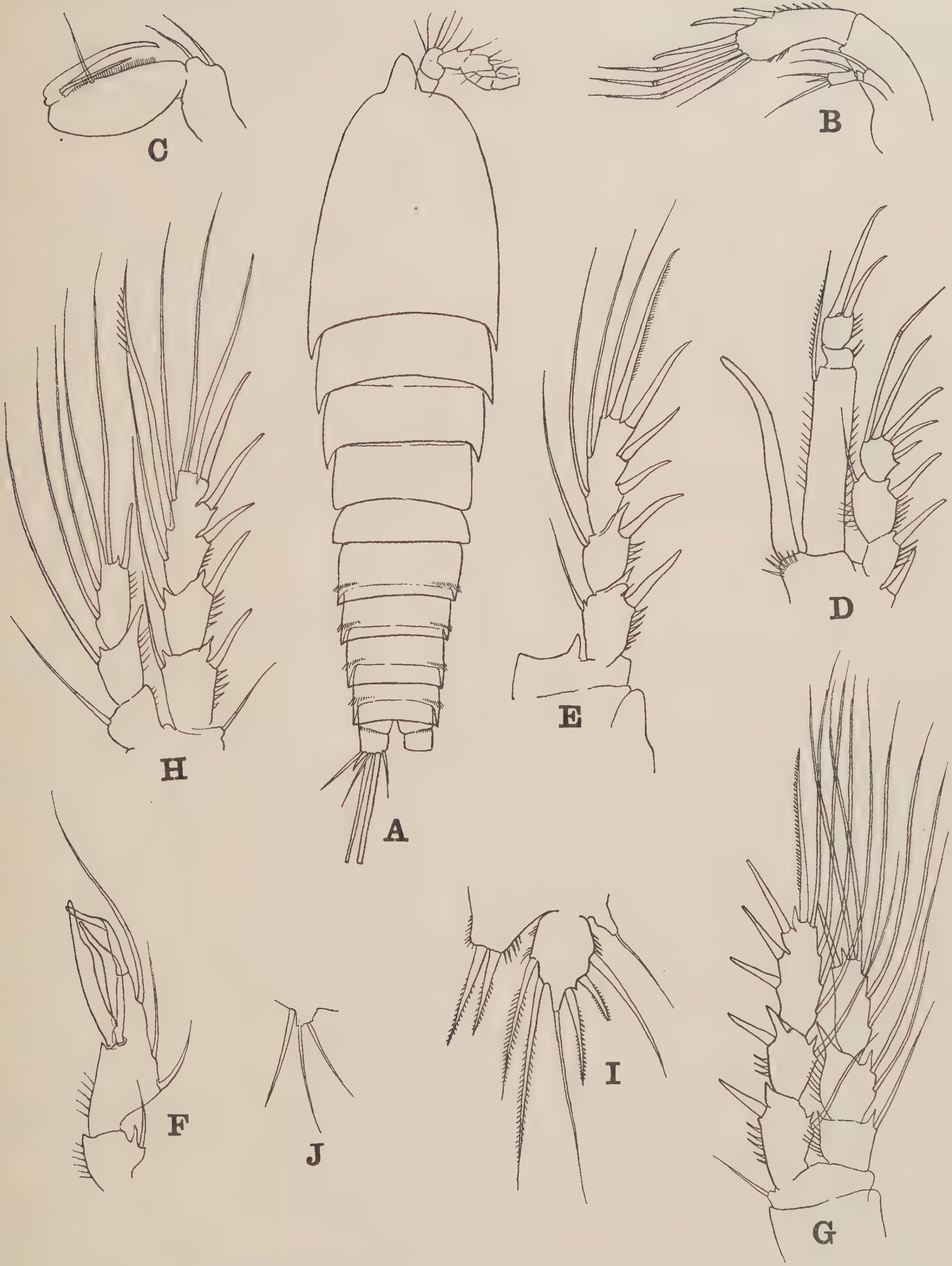
In the 2nd leg the endopod (Text-fig. 55, F) shows a similar modification to that of the typical form, but the shape of the distal segment differs somewhat, for the inner margin, instead of being indented sharply just distal to the origin of the 2nd inner seta, forms a uniform curve throughout the whole length of the segment. Two modified setæ arise from the junction of the proximal and distal portions of the segment on the outer border, and a single modified seta springs from the extreme apex of the segment; the inner border bears three setæ, of which the proximal is reduced in size.

The 3rd and 4th legs (Text-fig. 55, G and H) agree with those of *A. cinctus*.

In the 5th leg (Text-fig. 55, I) the inner, proximal segment bears two subequal serrated spines; the distal free segment is sub-triangular in outline and bears six setæ; three of the setæ are on the outer margin, the 2nd and 3rd being spine-like and serrated, a long delicate seta arises from the extreme apex and two setæ spring from the inner margin.

While exhibiting a close degree of resemblance to the male of *A. cinctus* (Claus) Sars, the above form differs in small details and corresponds to the male of *A. ceylonicus* (Thompson and A. Scott).

Distribution.—This species has been recorded from the Nicobar Islands (present



TEXT-FIG. 55.—*Amphiascus cinctus* (Claus). A, Male, dorsal view. B, 2nd antenna. C, Maxilliped. D, 1st leg. E, 2nd leg, exopod. F, 2nd leg, endopod. G, 3rd leg. H, 4th leg. I, 5th leg. J, Genital armature.

record), Port Said (Gurney), the Mediterranean Sea (Claus, Brian, Grandori, Monard), the coast of Bermuda (Willey), the Wood's Hole region of the N. American coast (Wilson), the Brittany Coast, Roscoff (Monard), the Irish coast (Farran), and the coast of Norway (Sars).

Amphiascus similis (Claus) Sars.

Amphiascus similis, Sars, 1903–11, p. 151, pl. xciv.
Amphiascopsis similis, Gurney, 1927*c*, p. 517, fig. 138.
Amphiascus similis, Monard, 1928*a*, p. 379, fig. xxviii, 2.

Occurrence.—Nankauri Harbour, Nicobar Islands, in weed-washings; a single female.

Descriptive Notes.—Sars (*loc. cit.*), in his account of this species, both describes and figures the 3rd segment of the exopod of the 1st leg as possessing only three spines and one seta; Monard, however, in his account figures the full complement of four spines and a seta. The present example agrees with Monard's account.

Distribution.—The Nicobar Islands (present record), Suez Canal (Gurney), the Mediterranean Sea (Monard, Claus, Brian), the Brittany coast, Roscoff (Monard), the coast of Ireland (Farran), the British Isles (Brady), and the coast of Norway (Sars).

Amphiascus ægyptius Gurney.

Amphiascus ægyptius, Gurney, 1927*c*, p. 518, fig. 139; Monard, 1937, p. 38, fig. 2*a*, *b*.

Occurrence.—Addu Atoll, Maldive Archipelago, in weed-washings; a single female.

Descriptive Notes.—♀. The present example, while agreeing in most particulars with Gurney's description, differs markedly in size, having a total length of 0·88 mm.; Gurney's specimens were only 0·45–0·55 mm. The proportional lengths of the anterior and posterior regions of the body are as 53 to 47. The proportional lengths of the segments of the posterior region are as follows:

Segment Abd. 1–2.	3.	4.	5.	Furca.
40	20	20	11	9 = 100

Distribution.—The Maldive Archipelago (present record), the Suez Canal (Gurney), and the Mediterranean Sea (Monard).

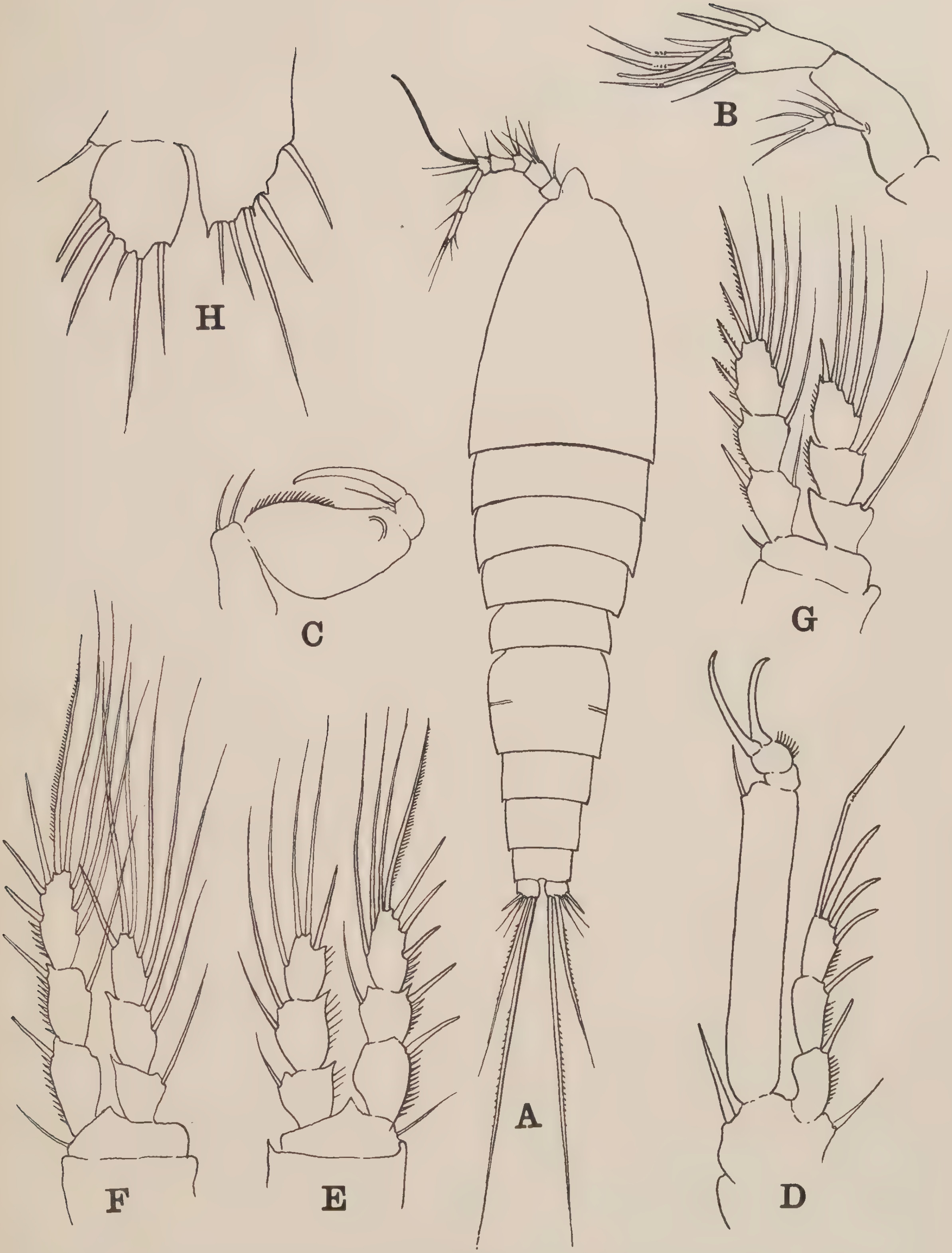
Amphiascus rebus sp. nov. (Text-fig. 56, A–H.)

Occurrence.—Addu Atoll, Maldive Archipelago, in weed-washings; several females, adult. Nankauri Harbour, Nicobar Islands, in weed-washings; one immature female, Stage V.

Descriptive Notes.—♀. Total length, 0·62–0·76 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 56, A) vary from 56 to 44, to 61 to 39. The proportional lengths of the segments of the posterior region are as follows:

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
14	35	19	17	10	5 = 100



Text-fig. 56.—*Amphiascus rebus* sp. nov. A, Female, dorsal view. B, 2nd antenna. C, Maxilliped. D, 1st leg. E, 2nd leg. F, 3rd leg. G, 4th leg. H, 5th leg.

The furcal rami are about one and a half times as broad as long. Each ramus bears at the distal outer angle a small spine. The two outermost setæ are very small, but the 2nd and 3rd setæ are well developed, the former being about twice the length of the latter and equal to the length of the posterior region of the body ; both setæ appear to be either very finely serrated or plumose.

The 1st antenna is of moderate length, and is composed of eight segments that have the following proportional lengths :

Segment 1.	2.	3.	4.	5.	6.	7.	8.
16	16	11	14	6	12	10	15 = 100

The terminal part of the antenna, consisting of the last four segments, is thus equal in length to the 2nd, 3rd and 4th segments together. The 4th segment bears the usual sensory filament.

The 2nd antenna (Text-fig. 56, B) is stoutly built, the terminal segment being relatively short ; this segment bears 4 spines, which increase in size distally, three geniculate setæ and a simple straight seta. The exopod is composed of three segments, but is comparatively short ; the 1st and 2nd segments each bear one seta, and the distal segment bears three.

The maxilliped (Text-fig. 56, C) is stoutly built and closely resembles that of *A. varicolor* Farran ; the proximal half of the " hand " is fringed along its anterior margin with fine spines, and in the distal third of the segment there is a semicircular thickening of the chitin.

The 1st leg (Text-fig. 56, D) resembles that of *A. cinctus* ; the exopod is about half the length of the proximal segment of the endopod. The endopod consists of three segments, and the distal segment bears two stout, subequal, claw-like spines. The distal segment of the exopod bears only three spines and a geniculate seta.

The setal formula for the 2nd–4th legs (Text-fig. 56, E, F and G) is as follows :

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P2	1	2	1, 2, 1	0	1	2, 2, 3
P3	1	2	2, 2, 1	0	1	3, 2, 3
P4	1	1	2, 2, 1	1	1	3, 2, 3

The 5th leg (Text-fig. 56, H) closely resembles that of *A. cinctus.* The proximal segment is broad and bears five spines, of which the middle is the longest and the inner two are stout and spine-like ; the distal outer angle of the plate is produced in a small pointed process. The distal free segment is but little longer than broad and bears six setæ, of which the innermost and the outer three are short and stout and spine-like, and the two arising from the distal end are unequal and delicate.

DISTRIBUTION.—Nicobar Islands and the Maldive Archipelago.

It has already been pointed out that the form known as *A. cinctus* exhibits a considerable range of variation, and it is possible that this may be merely another variety ; but the difference in the setal formula renders it advisable to regard the present form as a different species, at least until we know the extent to which the setal formula may vary within the limits of a species.

Amphiascus coralicola sp. nov. (Text-fig. 57, A–H.)

OCCURRENCE.—Henry Lawrence Island, Andaman Islands, in coral-washings. Addu Atoll, Maldive Archipelago, in weed-washings; examples of both sexes.

DESCRIPTIVE NOTES.—♀. Total length, 0·60 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 57, A) are as 54 to 46. The body is comparatively slender and tapers slightly to the posterior end. The posterior borders of all the abdominal segments are fringed with needle-like spinules on the ventral and lateral aspects. The distal outer angle of the furcal ramus bears a short spine. The rami are slightly broader than long, and the 2nd furcal seta is thickened at the base, as in *Amphiascus havelocki* (Thompson and A. Scott).

The 1st antenna (Text-fig. 57, C) is composed of eight free segments, but the 7th segment shows evidence of a partial subdivision into two. The proportional lengths of the antennal segments are as follows:

Segment	1.	2.	3.	4.	5.	6.	7–8.	9.	
	22	16	16	12	6	9	$\underbrace{8}_{4\text{–}4}$	11	= 100

The 4th segment is produced at its anterior distal angle as far as the distal end of the 5th segment; this process bears the usual sensory filament. The proportional lengths of the terminal portion of the antenna and the preceding two segments are as 34 to 28, thus closely resembling the condition present in *A. nicobaricus*.

The 1st leg (Text-fig. 57, D) closely resembles that of *A. cinctus* (Claus). The exopod is, however, slightly shorter, and only extends for about half the length of the proximal segment of the endopod. The 2nd segment is about twice the length of the 1st, and the 3rd segment bears four spines and a single geniculate seta. The endopod consists of three segments, the distal portion being clearly subdivided, and each part is fringed with a row of spinules. The distal segment bears two subequal claw-like spines.

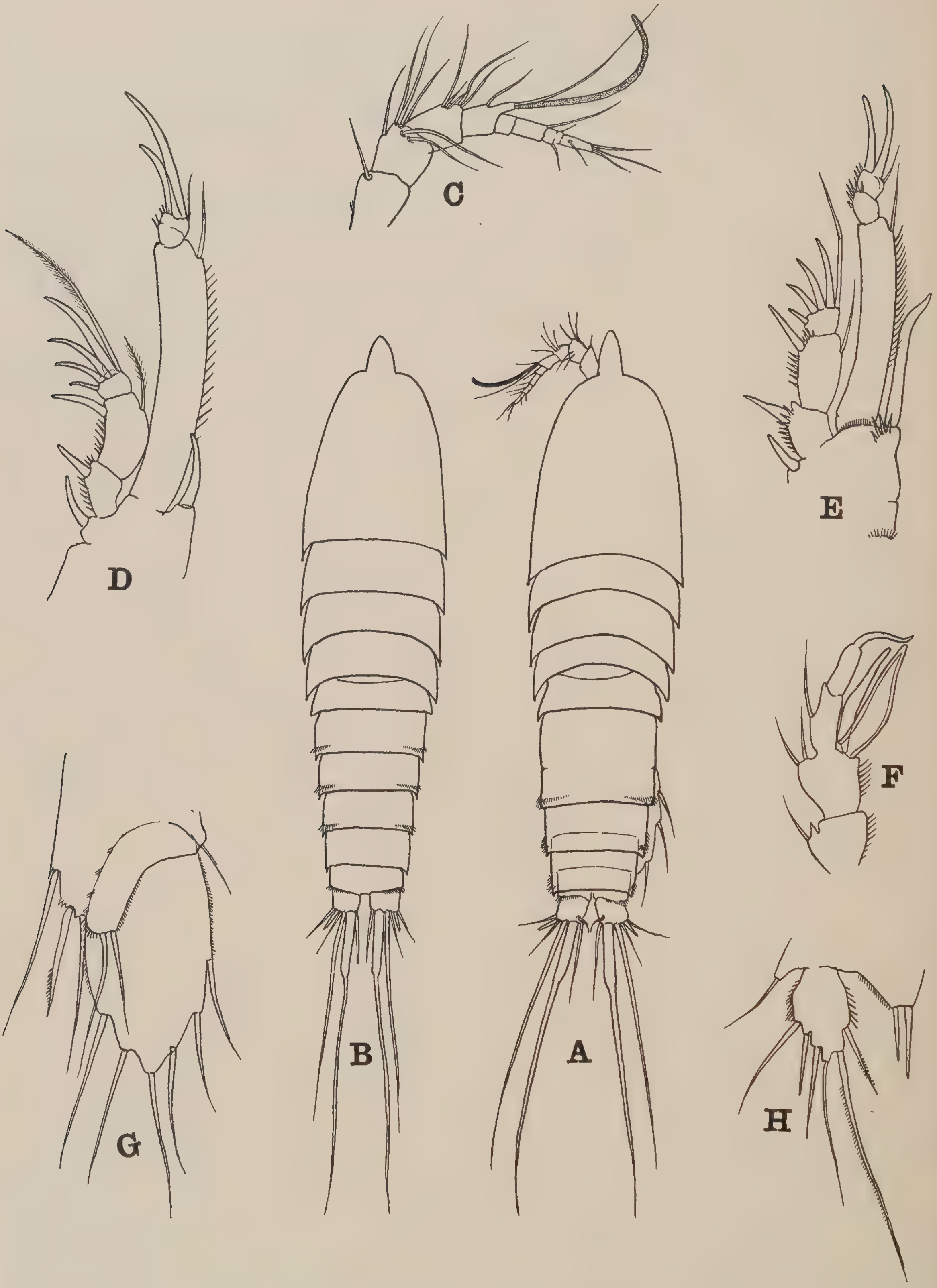
The setal formula for the 2nd–4th legs is as follows:

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P2	1	2	1, 2, 1	1	1	2, 2, 3
P3	1	2	3, 2, 1	1	1	3, 2, 3
P4	1	1	2, 2, 1	1	1	3, 2, 3

This species thus agrees with *A. hirsutus* (Thompson and A. Scott) and *A. banyulensis* Monard.

The 5th leg (Text-fig. 57, G) closely resembles that of *A. similis* (Claus). The proximal inner segment extends to less than half the length of the distal free segment; it bears five setæ, of which the 2nd, counting from the inner side, is modified into a spine. The distal segment is an elongate oval and bears six setæ, three on the outer margin, one at the extreme apex and two on the inner margin. Both inner and outer margins of the free segment are fringed with short hairs.

♂. Total length, 0·64 mm.



TEXT-FIG. 57.—*Amphiascus coralicola* sp. nov. A, Female, dorsal view. B, Male, dorsal view. C, 1st antenna, female. D, 1st leg, female. E, 1st leg, male. F, Endopod of 2nd leg, male. G, 5th leg, female. H, 5th leg, male.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 57, B) are as 57 to 43. The proportional lengths of the segments of the posterior region are as follows :

Segment Th. 5.	Abd. 1.	2.	3.	4.	5.	Furca.
12	19	19	19	17	7	7 = 100

The ventral and lateral aspects of segments 1, 2 and 3 are armed with a row of small needle-like spines, and a similar row runs along the line of articulation with each furcal ramus on the 5th segment. The proximal part of the 2nd furcal seta is thickened, as in the female.

In the 1st leg (Text-fig. 57, E) the spine that arises from the inner distal angle of the 2nd basal segment is considerably enlarged, and reaches to a little beyond the middle of the proximal segment of the endopod, thus resembling the male of *A. cinctus*, as figured by Sars (1903–11, pl. xcii), and *A. lagunaris* Grandori, as figured by Brian (1921*a*, fig. 53).

In the 2nd leg the endopodite (Fig. 57, F) is modified and is composed of only two free segments, segments 2 and 3 being fused. The proximal segment bears a single inner seta, and immediately distal to its origin the border is produced in a short spine-like projection. The distal segment in its proximal part is as wide as the 1st segment and bears at the distal inner angle two short setæ ; two modified setæ, the outer one much the larger and stouter, arise from the re-entrant angle between the proximal and distal parts of the combined segment. The narrower distal part of the segment bears a short seta on its inner border, and from the distal extremity arises a modified seta, in which the basal part is stout and thick and the distal part is more slender and is bent outwards at an angle. This ramus thus closely resembles the corresponding appendage in both *A. cinctus* (*vide* Sars, 1903–11, pl. xcii) and *A. lagunaris* (*vide* Brian, 1928*a*, fig. 54), but differs from both in that the inner marginal seta on the distal part of the 2nd segment is much smaller than in these species.

The 5th leg closely resembles that of *A. cinctus*. The proximal inner segment bears two spines ; the distal free segment bears on its outer border two markedly unequal setæ, the 2nd being by far the longest of all the setæ arising from the segment ; a delicate long seta arises from the extreme apex of the segment, and the inner border bears three setæ, of which the middle one is the smallest.

DISTRIBUTION.—Andaman Islands and the Maldive Archipelago.

The partial separation of the 7th segment of the 1st antenna shows a certain degree of affinity with the members of the "*Nasutus*" section ; but in other respects this form agrees closely with members of the "*Cinctus*" group. This resemblance is particularly close in the male and especially in the structure of the 1st and 2nd legs, in which three species, *A. cinctus*, *A. lagunaris* and the present species, are almost indistinguishable.

The female of the above species is, however, clearly distinct from either of the other two, as is shown by the structure of the 5th legs, and more nearly resembles *A. ægyptius* Gurney ; but it differs from this latter species in the character of the terminal joint of the exopod of the 1st leg, which is considerably broader than long and bears four spines and one geniculate seta, instead of three spines and two geniculate setæ in *A. ægyptius*.

The “Debilis” Group, Monard, 1928*b*, p. 379.

The members of this group are characterized, according to Monard, by the following : The 1st antenna consists of eight segments, the 4th being, as a rule, but little different from the 3rd. The exopod of the 2nd antenna possesses three segments, but the median is sometimes indistinct and may be altogether absent. The proximal segment of the endopod of the 1st leg is variable in its dimensions. The median segments of the swimming-legs 2 to 4 all bear a single seta. The setal formula for the 3rd segments of the endopod and exopod of these swimming-legs varies somewhat, but usually is 5·4–6·5–7·4. The distal segment of the 5th leg bears 5 setæ.

As Monard has pointed out, the setal formula for the majority of species in this group is as follows :

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P2	1	1	1, 2, 1	0	1	0, 2, 3
P3	1	1	2, 2, 1	0	1	1, 2, 3
P4	1	1	1, 2, 1	0	1	2, 2, 3

Among the species that are known definitely to possess this formula are—

Amphiascus affinis Sars (=*A. vararensis* Scott).
A. debiloides Monard.
A. hispidus Norman.
A. intermedius Scott.
A. invaginatus Monard.
A. littoralis Scott.
A. nannoides Sars.
A. neglectus Norman and T. Scott.
A. subdebilis Willey.
,, var. *intermixtus* Willey,

and to these should be added *A. robinsoni* (A. Scott) and *A. calcarifer* sp. nov.

In a few species there is a reduction in the number of setæ present on the swimming-legs ; thus we get the following formula—

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P2	1	1	1, 2, 1	0	1	0, 2, 3
P3	1	1	2, 2, 1	0	1	1, 2, 3
P4	1	1	1, 2, 1	0	1	1, 2, 3

in *Amphiascus debilis* Giesbrecht and *A. sterilis* Monard.

A further reduction with the formula

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P2	1	1	1, 2, 1	0	1	0, 2, 3
P3	1	1	2, 2, 1	0	1	1, 2, 3
P4	1	1	1, 2, 1	0	1	0, 2, 3

is present in *Amphiascus linearis* Sars.

Amphiascus robinsoni (A. Scott). (Text-fig. 58, A–G.)

Dactylopus robinsonii, A. Scott, 1902, p. 415, pl. iii, figs. 1–5.
Amphiascus robinsonii, Gurney, 1927*c*, p. 524, fig. 143.
Amphiascus robinsoni, Willey, 1930, p. 107, fig. 64.

OCCURRENCE.—Addu Atoll, Maldive Archipelago, in weed-washings; a single female.

DESCRIPTIVE NOTES.—♀. Total length, 0·55 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 58, A) are as 48 to 50. The anterior region is moderately robust. The segments of the posterior region are devoid of spines, with the exception of the 5th or anal segment, which is spinose on its dorsal and lateral aspects. The proportional lengths of the segments of the posterior region are as follows:

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
15	32	18	18	13	4 = 100

The line of fusion of the 1st and 2nd abdominal segments can be traced on the lateral aspect. The furcal rami are very short, being a little more than twice as broad as long. The 2nd furcal seta is moderately stout, and in the present specimen exhibits a slight "kink" near the base.

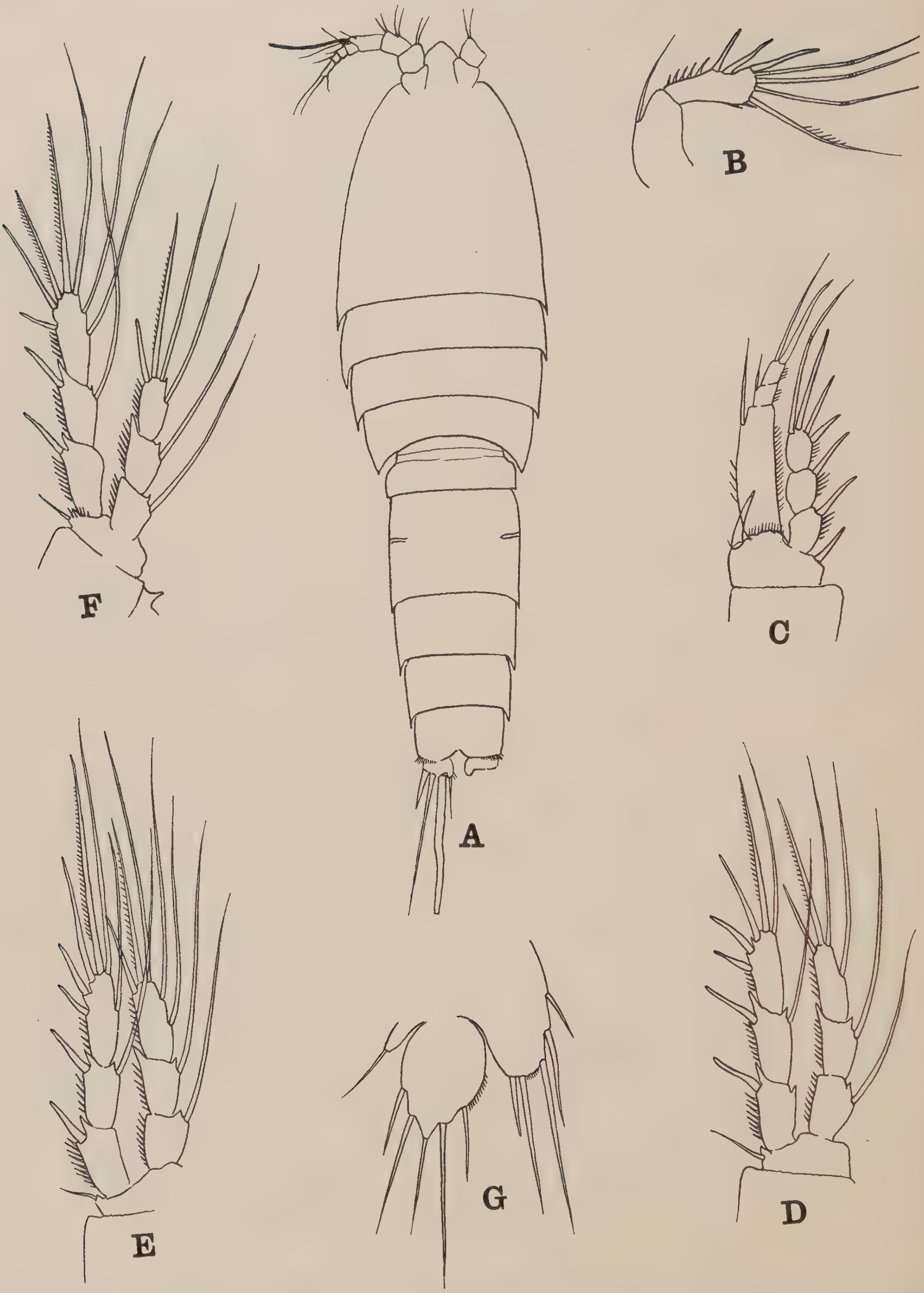
The 1st antenna is composed of eight segments.

In the 2nd antenna (Text-fig. 58, B) the distal segment bears three moderately stout spines, three geniculate setæ and one straight seta that is pectinate along a part of its length on the anterior side.

In the 1st leg (Text-fig. 58, C) the rami are 3-jointed, the exopod being slightly shorter than the proximal segment of the endopod. None of the segments of the exopod bears an inner seta, and the distal segment carries three spines and one seta. The two distal segments of the endopod are short and of about equal length; the 2nd segment bears a small delicate seta, and the 3rd segment carries a seta and a long spine.

The setal formula of the 2nd to 4th legs (Text-fig. 58, D, E and F) is as follows:

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P2	1	1	1, 2, 1	0	1	0, 2, 3
P3	1	1	2, 2, 1	0	1	1, 2, 3
P4	1	1	1, 2, 1	0	1	2, 2, 3



Text-fig. 58.—*Amphiascus robinsoni* (A. Scott). A, Female, dorsal view. B, 2nd antenna, endopod. C, 1st leg. D, 2nd leg. E, 3rd leg. F, 4th leg. G, 5th leg.

This agrees with the formula given by Willey (1931, p. 107). Gurney (1927*c*, p. 526) gives the number of setæ on the 3rd segment of the endopod of the 4th leg as 2, 1, 2 (which would correspond to my notation of 2, 2, 1), which does not agree with the present examples nor with the examples that were obtained by Willey off Bermuda (*loc. cit.*, 1930), in which the setal formula was as given above.

In the 5th leg (Text-fig. 58, G) the proximal segment reaches to about half-way along the distal segment and bears five setæ; the distal free segment is sub-oval and bears five setæ, two on the inner margin, which is fringed with small hairs, two on the outer margin, and one from the extreme apex at the end of a conical process.

DISTRIBUTION.—Addu Atoll, Maldive Archipelago (present record), the Red Sea (A. Scott), the Suez Canal (Gurney) and Bermuda (Willey).

Monard (1928*b*, pp. 366–7) has placed this species in his "*Giesbrechti*" group and states that the 2nd segments of the endopods of the 2nd–4th legs bear 2, 2, 1 setæ, and that in this species, as also in *giesbrechti* and *pallidus*, the terminal segments of the endopods and exopods bear 7·4–8·6–8·5 setæ or spines. A. Scott (1902, p. 416), in his original account of *robinsoni* neither describes nor figures the structure of the swimming-legs, and merely states that they "resemble those of *D. strömii*, but are smaller". There can, I think, be little or no doubt that the above form is identical with A. Scott's species, and it is clear that the number of setæ on the swimming-legs is not what Monard thought it to be. The 5th leg bears only five setæ on the free segment, and not six, as stated by Monard. The species must clearly be removed from the "*Giesbrechti*" group and be placed in the "*Debilis*" group, and Gurney (1927*c*, p. 524) has already pointed out that there is a close degree of resemblance between this species and *Amphiascus hispidus*, *A. affinis* and *A. intermedius*, all three of which are members of the "*Debilis*" group of Monard. Indeed, the resemblance of this species to *A. debilis* is extremely close; in both species the proportional lengths of the segments of the 1st antenna are extremely similar, as is evident from the table below, in which I have recalculated the measurements given by A. Scott for *robinsoni* and by Monard for *debilis*:

Segment	1.	2.	3.	4.	5.	6.	7.	8.
robinsoni .	18	18	15	18	6	6	6	15 = 102
debilis . .	19	18	14	17	6	6	7	12 = 99

The characters of the 1st leg are almost identical; in *robinsoni* the exopod, according to A. Scott, is equal in length to the proximal segment of the endopod, whereas in *debilis*, according to Sars and Monard, it is slightly shorter; but in the present specimens the length of the exopod is distinctly shorter than the proximal segment of the endopod, thus agreeing with *debilis*. The setal formula of legs 2–4 for the two species is identical, if we accept Monard's account of *debilis*, though according to Sars the 3rd segment of the exopod of the 4th leg bears only one seta on its inner margin instead of two. In both species the free segment of the 5th leg bears only five setæ.

Monard (1928*a*, p. 390) had under observation two forms of *debilis*, (i) a larger form having a length of 0·54 mm., that agrees closely as regards the shape of the free segment of the 5th leg with Sars' specimens, which, however, measured only 0·46 mm.; and (ii) a smaller form, measuring only 0·45 mm., in which the free segment of the 5th leg was shorter and approached in form the rather pyriform shape of *robinsoni*.

Willey (1935, p. 64) has recorded from Bermuda what he believed to be a new species, closely allied to *A. debilis*, and to which he gave the name *A. subdebilis* ; in this form, which has a total length of 0·47 mm., the setal formula of the swimming-legs is identical with that given above for *robinsoni* and Monard's examples of *debilis*, the 3rd segment of the exopod of the 4th leg having 2, 2, 3 setæ and spines ; the general shape of the free segment of the 5th leg also agrees with that found by Monard in his specimens of what he believes to be *debilis*.

It thus seems probable that what Monard took to be examples of *debilis* are actually specimens of *A. subdebilis* Willey. Willey also obtained specimens of what he thought to be a variation of *subdebilis*, to which he gave the name var. *intermixtus* ; in this form the setal formula of the swimming-legs agrees with that given above for *robinsoni*, and the shape of the free segment of the 5th leg agrees fairly closely with that of the smaller form of what Monard thought to be *A. debilis*, and is identical with the form in *robinsoni* (*cf.* Text-fig. 58, G, and Willey, 1935, fig. 48).

It would thus seem probable that the various forms can be identified as follows :

Amphiascus debilis Giesbrecht. Syn. *A. debilis* Sars.
Amphiascus subdebilis Willey. Syn. *A. debilis*, large form, Monard.
Amphiascus robinsoni A. Scott. Syn. *A. debilis*, small form, Monard, and *A. subdebilis* var. *intermixtus* Willey.

Amphiascus calcarifer sp. nov. (Text-fig. 59, A–I ; Text-fig. 60, A–G.)

Occurrence.—Addu Atoll, Maldive Archipelago, in weed-washings ; several examples of both sexes.

Descriptive Notes.—The examples fall into two distinct groups, differing in size.

f. *minor*.

♀. Total length, 0·79 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 59, A) are as 53 to 47. The body is moderately robust. The rostrum is long, reaching well beyond the 2nd segment of the 1st antenna, and is pyriform in shape, being somewhat swollen at its base and tapering to a sharp point, as in *A. typhlops*. The posterior thoracic margin is armed on each side in the dorso-lateral region with a claw-like spine. The proportional lengths of the segments of the posterior region are as follows :

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
13	36	15	15	17	4 = 100

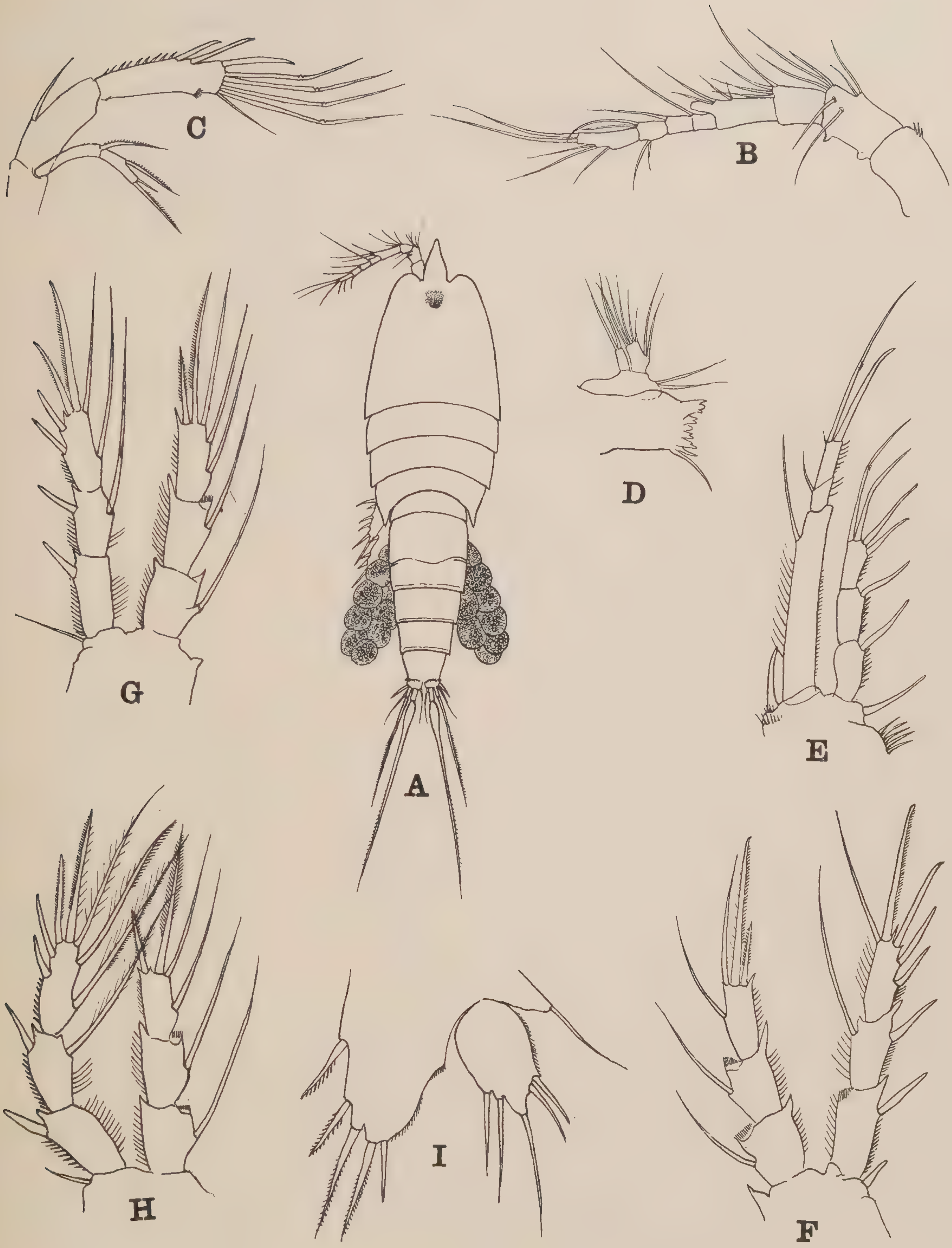
The abdomen tapers towards the posterior end. The furcal rami are about twice as broad as long and the 2nd furcal seta is swollen at its base.

The 1st antenna (Text-fig. 59, B) reaches back to about half the length of the cephalosome ; it consists of eight segments that have the following proportional lengths :

Segment 1.	2.	3.	4.	5.	6.	7.	8.
22	20	11	15	6	7	7	12 = 100

On the posterior margin of the 2nd segment are two small conical processes, one near the distal end and the other close to the proximal. The 1st segment bears a row of spinules distally on its anterior margin.

The 2nd antenna (Text-fig. 59, C) is slender and is composed of three segments, the terminal one bearing three spines, four geniculate setæ and a single, straight seta ; the

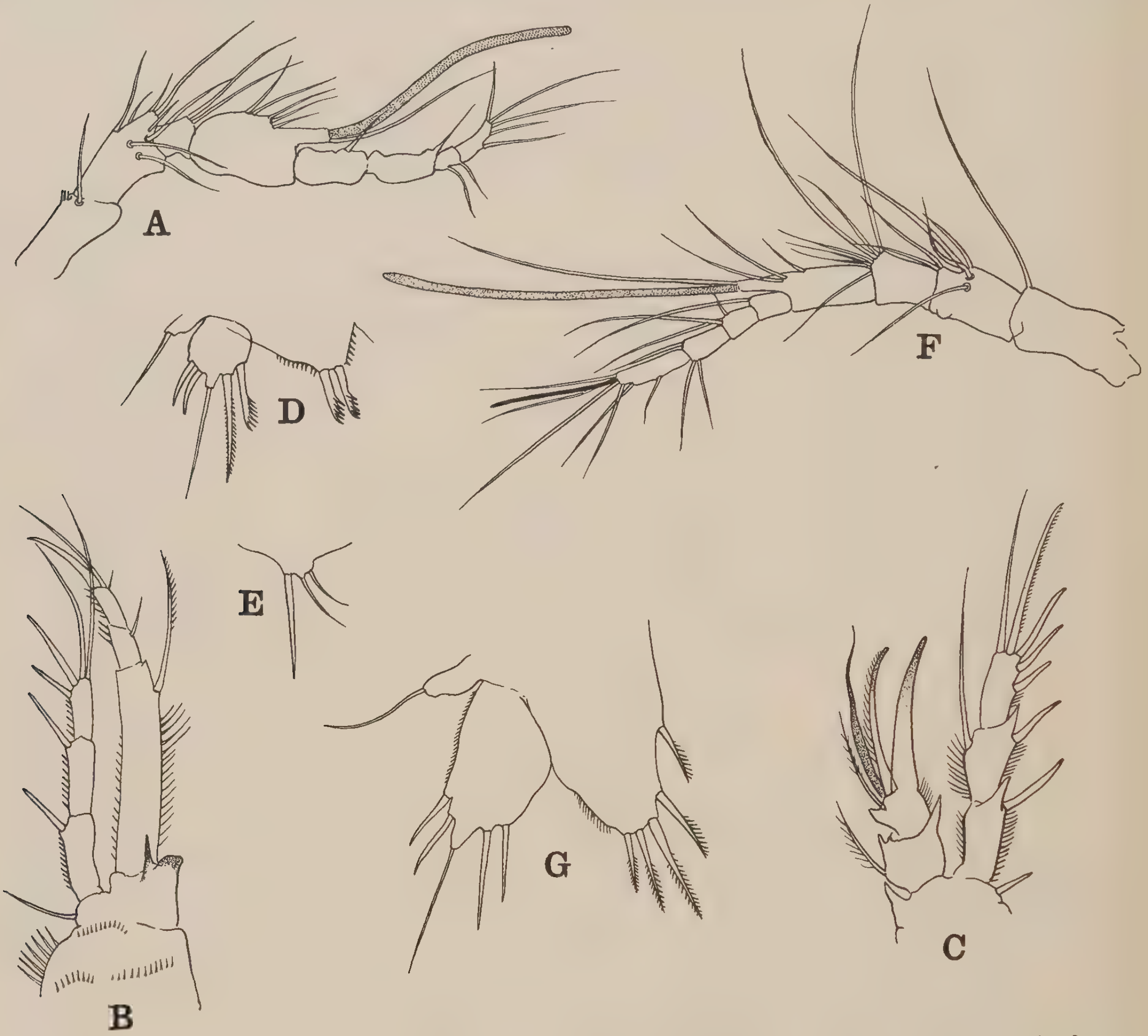


Text-fig. 59.—*Amphiascus calcarifer* sp. nov., f. *minor*, ♀. A, Female, dorsal view. B, 1st antenna. C, 2nd antenna. D, Mandible. E, 1st leg. F, 2nd leg. G, 3rd leg. H, 4th leg. I, 5th leg.

exopod is composed of only two segments, of which the first bears one and the distal three setæ.

The mandible (Text-fig. 59, D) has the usual form and the palp bears two unjointed rami.

In the 1st leg (Text-fig. 59, E) both rami are three-jointed. The exopod reaches to the level of the seta that arises from the inner margin of the proximal segment of the endopod; the terminal segment of the exopod bears three spines and one geniculate seta at its distal end. The 2nd and 3rd segments of the endopod are comparatively short and slender; each bears a small seta at its distal inner angle, that on the 3rd segment being extremely small, and from the distal end of the 3rd segment arise a slender spine and a single geniculate seta.



Text-fig. 60.—*Amphiascus calcarifer* sp. nov. A, 1st antenna, male, f. *minor*. B, 1st leg, male, f. *minor*. C, 2nd leg, male, f. *minor*. D, 5th leg, male, f. *minor*. E, Genital armature, male, f. *minor*. F, 1st antenna, female, f. *major*. G, 5th leg, female, f. *major*.

In the 2nd–4th legs (Text-fig. 59, F, G and H) the setal formula is that characteristic of the majority of species in this group, the distal segment of the exopod of the 4th leg bearing two setæ on its inner border.

In the 5th leg (Text-fig. 59, I) the inner lobe is very large and reaches as far as the distal end of the free segment; it bears five spines, and the outer margin is fringed with small spinules. The distal, free segment is narrowly sub-oval, and the extreme distal end tapers to a point; two subequal setæ arise from the outer margin, one long seta from the conical distal end, and two unequal setæ from the inner margin.

♂. Total length, 0·65 mm.

The proportional lengths of the anterior and posterior regions of the body are very similar to those in the female. The rostrum is long and pointed, and appears to be even longer than in the female. The posterior thoracic margin possesses similar claw-like, spinous projections. In this sex the 2nd furcal seta is not swollen at the base.

The 1st antenna (Text-fig. 60, A) forms the usual grasping organ.

In the 1st leg (Text-fig. 60, B) the 2nd basal segment is produced at the inner distal angle in a bluntly rounded process; on the immediate outer side of which and confluent with it is a straight, sharp spine.

The endopod of the 2nd leg (Text-fig. 60, C) is, as usual, modified and consists of only two segments, segments 2 and 3 being fused. The character of this fused segment agrees in its general form extremely closely with the corresponding part in *Amphiascus hispidus* (Norman) and *A. intermedius* (Scott) as figured by Sars (1903–11, pls. cviii and cx) and of *A. affinis* Sars (*cf.* Monard, 1928*a*, fig. xxxiii, 2), but differs markedly from that of *A. debilis* (Giesbrecht). The inner border of the distal segment is produced near the proximal end in a claw-like process, on the distal side of which arises an unmodified seta; immediately beyond this two modified setæ arise close together, the first flagelliform and the second curved and thickened; finally the distal part of the segment is itself produced in a long, curved, tapering process.

In the 5th leg (Text-fig. 60, D) the proximal inner segment is very wide and from the distal end arise two sub-equal comb-like spines; the inner border and the distal third of the outer margin are fringed with small spinules. The distal free segment is sub-circular, being as broad as long; from the outer margin arise two equal, slightly curved spines; from the extreme apex, which is produced in a small papilla, arises an unmodified seta; and from the inner margin spring two unequal spines, the inner of which is the smaller and is comb-like.

The margin of the genital segment (Text-fig. 60, E) is armed with a long spine and two delicate setæ.

f. *major*.

Associated with the above specimens were three females of a much larger size:

♀. Total length 1·05–1·13 mm.

The proportional lengths of the anterior and posterior regions in this form are as 58 to 42 or 60 to 40.

The general shape and character of the body were identical with those of the smaller examples.

The proportional lengths of the segments of the 1st antenna (Text-fig. 60, F) are as follows:

Segment 1.	2.	3.	4.	5.	6.	7.	8.
22	20	11	16	6	6	7	12 = 100

There is thus no appreciable difference between the two forms.

In these larger examples the 5th leg (Text-fig. 60, G), while having the same general character as the appendage in the smaller forms, differs slightly; the distal segment is somewhat longer in proportion to its breadth, and is flattened on the outer side and more prominently curved on the inner. In both forms the outer margin is fringed with small spinules and there are five setæ, the central one arising from a papilla at the apex of the segment.

Both large and small forms were sexually mature, the females bearing egg-sacs.

There seems no valid reason for the separation of these two forms, and their occurrence indicates either that there is a great range of variation in size or, as I think more probable, that they represent dimorphic forms, a high and a low, of the same species, similar to those that have been found in *Teissierella propinqua* T. Scott (*vide* Sewell, 1935, p. 819, under *Amphiascus scotti*) and *T. knoxi* (Thompson and A. Scott) (*vide* Gurney, 1927*c*, p. 532, under *Robertsonia knoxi*).

In the character of the rostrum this species closely resembles *A. lagenirostris* Sars and *A. spinifer* Farran, and the presence of spines on the dorso-lateral part of the posterior thoracic region adds to the resemblance to the latter, though, according to Farran (1913, p. 13, fig. 3), these projections in *spinifer* are on the 5th thoracic segment, whereas in the present form they are on the 4th. The character of the 5th leg is, however, quite distinct from either of these species.

DISTRIBUTION.—At present known only from the Maldive Archipelago.

Amphiascus sp. (Text-fig. 61, A–H.)

OCCURRENCE.—Sta. 45, South Arabian Coast, 40 m. in mud; a single male.

DESCRIPTIVE NOTES.—♂. Total length, 0·44 mm.

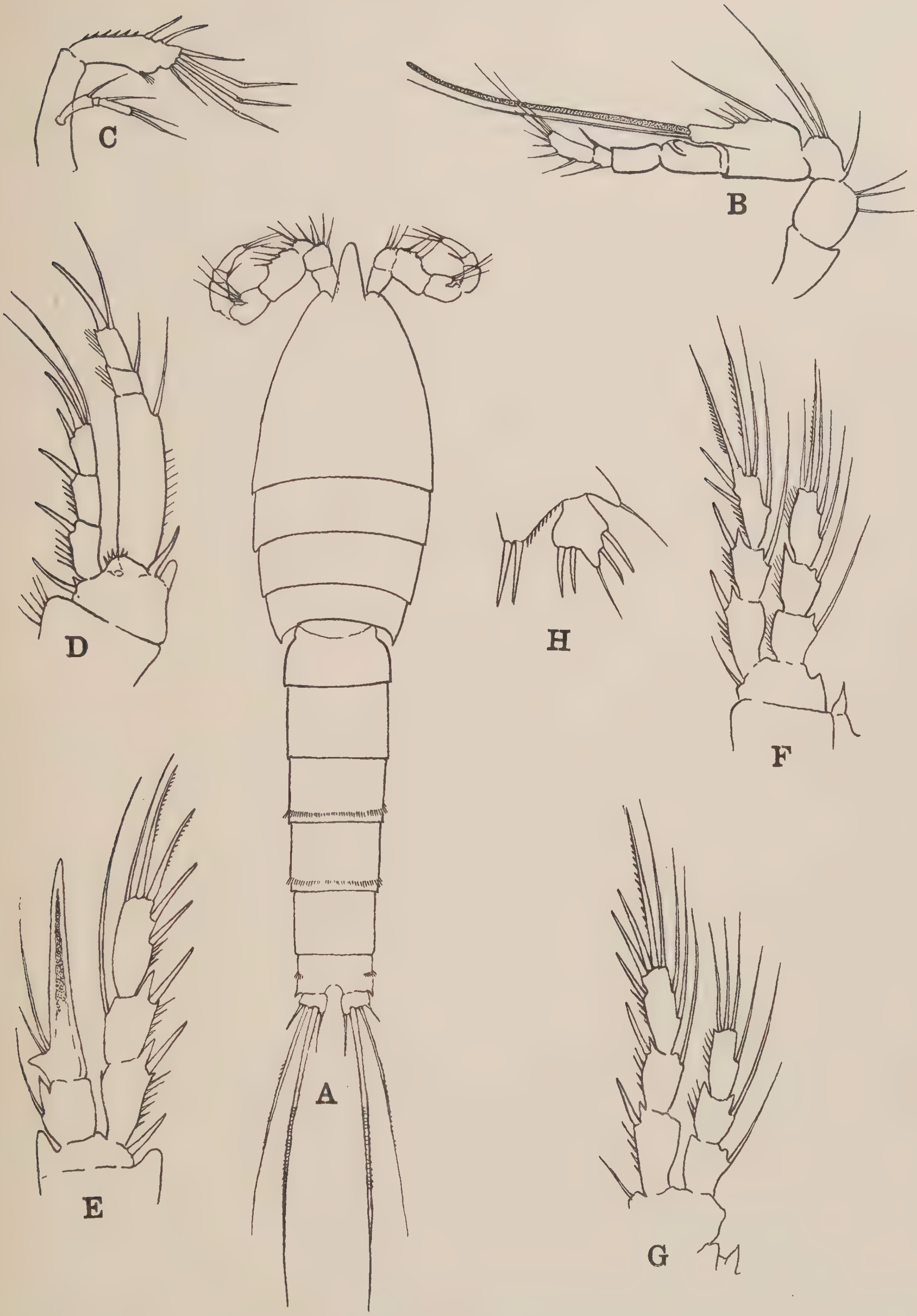
The proportional lengths of the anterior and posterior regions of the body (Text-fig. 61, A) are as 9 to 10. The general bodily form is comparatively slender. The rostrum is long, being equal in length to the first two segments of the 1st antenna, and is bluntly rounded. The abdomen consists of five segments that have the following proportional lengths:

Segment Th. 5.	Abd. 1.	2.	3.	4.	5.	Furca.
13	19	20	17	17	11	3 = 100

Segments 2 and 3 are furnished with a row of small needle-like spinules close to the posterior margin. The anal segment bears a row of spinules in the lateral aspect at about half the length of the segment. The furcal ramus is very short, the proportion of length to breadth being as 3 to 11. The 2nd furcal seta is as long as the whole abdomen; in the middle third of its length it presents the appearance of being segmented, and is furnished with a row of small spinules along the outer margin. The 3rd seta is also fringed with small spinules.

The 1st antenna (Text-fig. 61, B) forms the usual grasping organ; the 4th segment is produced distally in a long process that reaches to beyond half the length of segment 5; from this process arises a long seta and a long sensory filament.

The 2nd antenna (Text-fig. 61, C) consists of two segments, the distal being fringed with small spinules along its anterior margin and bearing three somewhat delicate spines, three geniculate setæ and a simple seta distally. The exopod is composed of three segments,



TEXT-FIG. 61.—*Amphiascus*, sp., ♂ A, Male, dorsal view. B, 1st antenna. C, 2nd antenna. D, 1st leg. E, 2nd leg. F, 3rd leg. G, 4th leg. H, 5th leg.

the proximal bearing a single seta, the middle very small and without a seta, and the distal as long as the proximal, and bearing one seta on the anterior margin and two distally.

In the 1st leg (Text-fig. 61, D) the proximal segment of the endopod is slightly longer than the whole exopod. The exopod is composed of three segments that are subequal and are devoid of any inner setæ; the 3rd segment bears two spines and two delicate setæ. The proximal segment of the endopod is somewhat stout, and the distal segment bears one stout curved claw that is as long as the 2nd and 3rd segments together, and a single seta. The 2nd basal segment is produced at its inner distal angle in a blunt digitiform process, near the base of which arises a stout spine; a spine arises from the outer margin.

The 2nd leg possesses the usual modified endopod and very closely resembles that of *Amphiascus affinis* Sars, as described by Monard (1928*a*, p. 293, fig. xxxiii, 2, P II end., ♂); the 2nd basal segment bears a stout spine externally, and internally is produced in a blunt conical process. The exopod is composed of three segments, of which the 1st and 2nd are subequal, and are produced in a sharp process at the distal outer angle; exopod 1 is devoid of a seta and exopod 2 bears a single one. The endopod is composed of two joints only, segments 2 and 3 being fused; segment 1 bears a single, delicate inner seta and is produced at the distal inner angle in a sharp point; segment 2 forms a long, pointed and stout process, that reaches well beyond the extreme end of the exopod and in which the chitin is strongly thickened; near the base this segment is produced internally in a sharp, pointed process, on the distal side of which arise two unequal setæ.

The setal formula of the swimming-legs (Text-fig. 61, E, F, and G) appears to be as follows:

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P2	modified.			0	1	0, 2, 3
P3	1	1	2, 2, 1	0	1	1, 2, 3
P4	1	1	1, 2, 1	0	1	2, 2, 3

In the 5th leg (Text-fig. 61, H) the basal segment is well produced, and from the apex of the prominence arise two stout spines; the distal segment is broadly triangular in shape and is nearly as broad as long; two spines arise from the outer margin, a delicate seta from the extreme apex and two spines from the inner margin.

This male appears to belong to a female of the "*Debilis*" group of Monard (1928*b*, p. 379), that includes the following species:

hyperboreus T. Scott.
neglectus Norman and T. Scott.
nannoides Sars.
sterilis Monard.
brevifurca Cziernansky.
linearis Sars.
invaginatus Monard.
dispar T. Scott.
limicola Brady.
intermedius T. Scott.
affinis Sars (= *vararensis* T. Scott).
hispidus Norman.
proximus T. Scott.
debilis Giesbrecht.
nanus Sars.
littoralis T. Scott.

In the majority of these species the male is still unknown, only those of *debilis* Giesbrecht, *linearis* Sars, *hispidus* Norman, *intermedius* T. Scott and *affinis* Sars having been described;

of these, *debilis* and *linearis* are closely related, and the males exhibit the same type of modification in the endopod of the 2nd leg; *hispidus* and *intermedius* possess a different type of modification, closely resembling each other; and *affinis* exhibits a third type, to which the present specimen clearly conforms. As, however, none of these species has as yet been recorded from Indian waters, I hesitate to assign this male to any of them: it may possibly prove to be the unknown male of *robinsoni*.

THE "DENTICULATUS" GROUP, Monard, 1928*b*, p. 376.

The species of this group are characterized, according to Monard, by the following:

The 1st antenna is composed of eight segments; there is a spinous process, either internally or externally, on the 2nd segment. The exopod of the 2nd antenna possesses three segments. The exopod is equal to or shorter than the 1st segment of the endopod in the 1st leg. The 2nd segment of the endopod of the 2nd–4th legs bears 2, 1 and 1 setæ respectively. The 3rd segment of the endopod of these legs bears 4, 5 and 4 setæ respectively, while the terminal segments of the exopods bear 7, 7 and 8 setæ.

This latter statement, however, appears to require modification. Monard includes in this group only two species, namely *A. denticulatus* (Thompson) and *A. lagenirostris* Sars, and the setal formula for the 4th legs in these two species differ, as is shown below:

P4.	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
denticulatus	1	1	1, 2, 1	1	1	3, 2, 3
lagenirostris	1	1	2, 2, 1	1	1	2, 2, 3

The character of the 5th leg in *denticulatus* is remarkably similar to that of both *A. normani* Sars, *A. blanchardi* (T. and A. Scott) and *A. dentipes* (Thompson and A. Scott), for in all four the distal outer angle of the free segment is produced outwards in a pointed process; but in all these latter species the setal formula of the 4th leg is different, as shown below:

P4.	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
normani	1	1	1, 2, 1	1	1	2, 2, 3
blanchardi	1	1	2, 2, 1	1	1	2, 2, 3
dentipes	1	1	2, 2, 1	1	1	3, 2, 3

Monard, basing his scheme on the presence or absence of a spine on the 2nd segment of the 1st antenna, has separated *denticulatus*, which he makes the "type" of a group, and *lagenirostris* from *dentipes*, *normani* and *blanchardi*, and of these, *dentipes* and *normani* are included in the "*Varians*" group, while he makes *blanchardi* the "type" of the group of that name.

Amphiascus inermis sp. nov. (Text-fig. 62, A–G.)

OCCURRENCE.—Nankauri Harbour, Nicobar Islands, in tow-netting from 20 fathoms; a single specimen.

DESCRIPTIVE NOTES.—♂. Total length, 0·61 mm.

The body is long and slim, tapering but little, if at all, towards the posterior end.

The proportional lengths of the anterior and posterior regions of the body are as 53 to 74. The rostrum (Text-fig. 62, A) is long, and reaches beyond the end of the 2nd segment of the 1st antenna. The furcal rami are very short and the furcal setæ normal. The proportional lengths of the segments of the abdomen are as follows :

Segment Abd. 1.	2.	3.	4.	5.	Furca.
24	21	18	17	15	5 = 100

The 1st antenna (Text-fig. 62, A) forms the usual grasping organ ; the 3rd segment is much shorter than either the 2nd or 4th. There is no trace of any spinous projection or tubercle on the 2nd segment.

The 2nd antenna (Text-fig. 62, B) is relatively short and closely resembles that of *A. denticulatus* (Thompson) ; the distal segment bears three spines, four geniculate setæ and a single simple seta. On the anterior margin of the distal segment proximal to the 1st spine is a series of five spinules. The exopod is composed of three segments, of which the 2nd is very short, but bears a seta, the proximal segment bears a single seta, and the distal segment bears one seta near the base and two at the distal end.

The 1st leg (Text-fig. 62, C) closely resembles that of *A. denticulatus.* In the 2nd basal segment the inner margin is produced into a curved bifid process, and immediately distal to this arises a stout curved inner spine. The rami are each composed of three segments. The exopod is slightly longer than the 1st segment of the endopod and the distal segment bears three spines and two geniculate setæ; the proximal segment is devoid of an inner seta and the 2nd segment carries a short delicate one. In the endopod the distal segment is about three times the length of the 2nd, and bears a delicate seta at the inner distal angle, a long seta at the distal end and a long delicate spine at the distal outer angle.

The endopod of the 2nd leg (Text-fig. 62, D) is modified, segments 2 and 3 being fused. From that part of the fused segment that corresponds to segment 2 two markedly unequal setæ arise from the inner margin, the proximal being much the smaller. Two modified setæ arise from the outer border and one modified seta from the extreme apex. A single unmodified seta arises from the inner margin near the distal extremity.

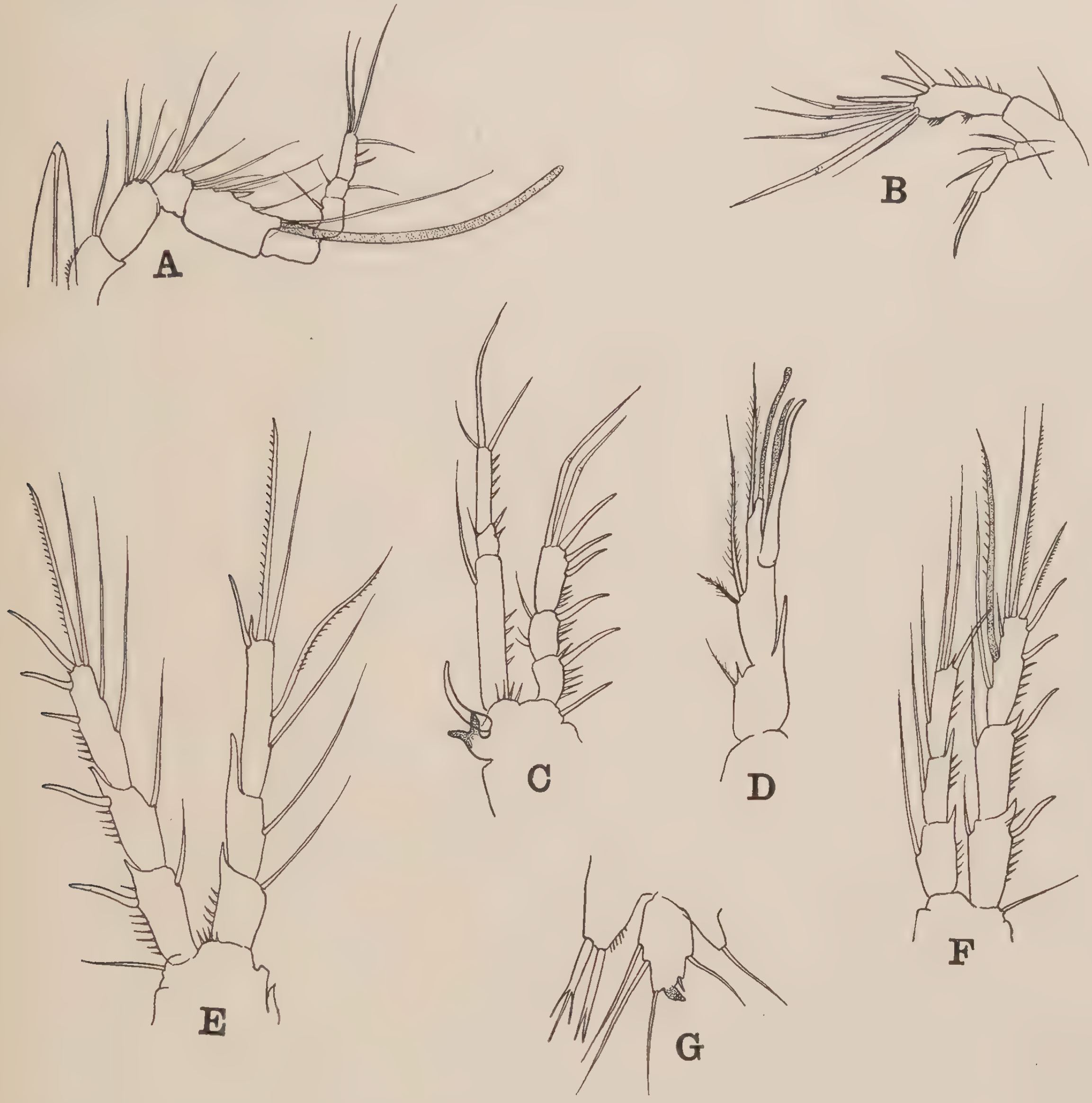
The setal formula for the 3rd and 4th legs (Text-fig. 62, E and F) is as follows :

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P3	1	1	2, 2, 1	1	1	2, 2, 3
P4	1	1	1, 2, 1	1	1	3, 2, 3

Of the setæ arising from the inner border of the distal segment of the exopod of the 4th leg the 2nd is thickened and serrated and the 3rd is extremely small and vestigial, thus closely resembling the condition found in *A. denticulatus.*

The 5th leg (Text-fig. 62, G) also is very similar to that of *A. denticulatus.* The proximal inner segment bears two spines on its distal margin ; of these the inner is triradiate and the outer bifid. The distal free segment is sub-oval in shape and extends well beyond the distal end of the basal segment ; from the inner margin arise two delicate subequal setæ ; a single seta arises from the extreme apex, and immediately external to this the outer angle of the segment is produced in a triangular outwardly-directed process; from the outer margin near the distal end arises a very short seta, and from about the middle of this border a 2nd seta arises.

There can, I think, be little doubt that this form exhibits a close relationship to *A.* *denticulatus*, but the complete absence of any spinous process on the 2nd antennal segment clearly separates the two.



Text-fig. 62.—*Amphiascus inermis* sp. nov. A, Rostrum and 1st antenna. B, 2nd antenna. C, 1st leg. D, Endopod of 2nd leg. E, 3rd leg. F, 4th leg. G, 5th leg.

Distribution.—The Nicobar Islands.

As mentioned above, this species closely resembles *A. denticulatus*, the most obvious difference being the absence in the present form of a spine on the 2nd segment of the 1st antenna. According to Monard's scheme, this would be sufficient to separate the two forms and to place them in different groups. It seems to me that *denticulatus*, *normani*, *blanchardi* and the present form together form a natural group, in which there has been a progressive reduction in the number of the setæ on the swimming-legs in both the endopods and exopods.

THE "TYPHLOPS" GROUP, Monard, 1928*b*, p. 378.

Monard includes in this group the following species :

Amphiascus typhlops Sars.
A. rostratus Gurney.
A. spinulosus Sars.
A. dictydiophorus Monard.

To these should be added *A. ctenophorus* Monard.

The members of this group are stated by Monard to be characterized as follows :

The 1st antenna is composed of eight segments, of which the 4th is much longer than the 3rd, except in *A. typhlops*.* The exopod of the 2nd antenna is composed of three segments. The median segments of the exopods of legs 2–4 bear only one seta. The distal segments of the exopods of the 2nd–4th legs bear four, five and four setæ respectively, while the terminal segments of the exopods bear six and seven setæ or spines. The free segment of the 5th leg has six setæ, and the segment is elongate except in *A. rostratus* Gurney.

Unfortunately Monard has overlooked the fact, clearly shown by Sars (1903–11, pl. cxi), that in *A. typhlops* the median segment of the 2nd leg bears two, not one, setæ.

Amphiascus typhlops Sars. (Text-fig. 63, A–G.)

Amphiascus typhlops, Sars, 1903–11, p. 170, pl. cxi.
? *Stenhelia accraensis*, T. Scott, 1894, p. 95, pl. x, figs. 2–12.

OCCURRENCE.—Addu Atoll, Maldive Archipelago, in weed-washings ; a single specimen, female.

DESCRIPTIVE NOTES.—♀. Total length, 0·67 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 63, A) are as 54 to 46. The rostrum is long and pointed. The segments of the posterior region have the following proportional lengths :

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
12	34	14	14	12	14 = 100

The genital segment is traversed by a clear thick ridge of chitin across the dorsal aspect. The furcal rami are considerably longer than wide in the proportion of 15 to 11.

The 1st antenna (Text-fig. 63, B) is comparatively short and is composed of eight segments, that have the following proportional lengths :

Segment 1.	2.	3.	4.	5.	6.	7.	8.
26	21	11	11	4	4	7	16 = 100

The 4th segment thus appears to be somewhat shorter than in the specimens Sars examined.

The 2nd antenna (Text-fig. 63, C), mouth-parts and 1st pair of legs (Text-fig. 63, D) agree closely with the description and figures given by Sars (*loc. cit.*).

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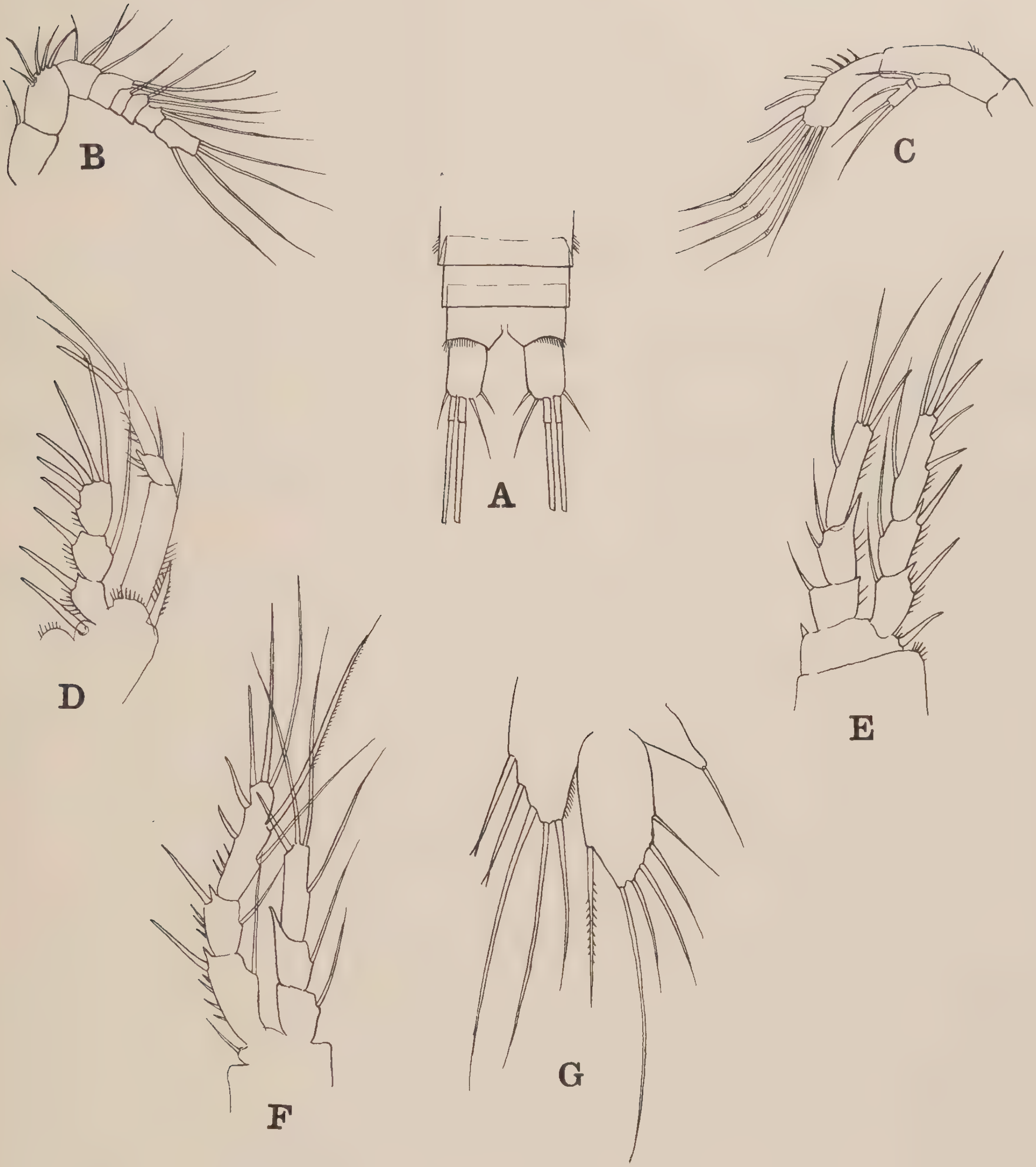
* Monard (*loc. cit.*) states that "L'antennule à 8 articles dont le quatrième est plus long que le troisième a l'exception de typhlos (*sic*)". Sars (1903–11, p. 170) states that in this species "the 4th joint is not much longer than the 3rd".



Text-fig. 63.—*Amphiascus typhlops* Sars, ♀. A, Posterior abdominal segments and furca. B, 1st antenna. C, 2nd antenna. D, 1st leg. E, 2nd leg. F, 4th leg. G, 5th leg.

Sars has given figures of all three swimming-legs, and from these it would appear that the setal formula for legs 2–4 is as follows :

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P2	1	2	1, 2, 1	1	1	1, 2, 3
P3	1	1	2, 2, 1	1	1	1, 2, 3
P4	1	0	1, 2, 1	1	1	2, 2, 3

The present specimen differs from this, since on the 2nd segment of the endopod of the 4th leg a seta is present (*vide* Text fig. 63, F).

The 5th leg (Text-fig. 63, G) agrees closely with the figure given by Sars, but the distal free segment appears to be slightly wider than in the Norwegian form; in the present specimen the two inner setæ on the proximal segment are bifurcate, whereas Sars shows only the innermost but one with this pecularity.

Distribution.—The coast of Norway (Sars), the West and South parts of the Baltic Sea (Klie) and the Arctic Ocean (Sars). The present record extends the distribution to the Indian Ocean, Maldive Archipelago.

There is a distinct resemblance between this species and the form described by T. Scott (*loc. cit.*) from the Gulf of Guinea under the name *Stenhelia accraensis*, especially as regards the 2nd antenna, mouth-parts and the 1st and 5th pairs of legs, the free segment of this last being slightly broader in *typhlops* than in *accraensis*, though the arrangement of setæ is identical, and in both the 2nd seta on the inner margin of the proximal segment is bifid. Scott does not state the number of setæ on the inner margin of the 2nd segment of the endopod of the 2nd leg, but states that the legs resemble those of *Stenhelia ima* (= *Amphiascus imus* (Brady)), in which there are two. The only obvious difference between these two forms appears to be the 1st antenna, which, according to T. Scott, is composed of nine segments in *accraensis*, whereas there are eight in *typhlops*.

Amphiascus ctenophorus Monard. (Text-fig. 64, A–I.)

Amphiascus ctenophorus, Monard, 1928*a*, p. 395, fig. xxxiv, 2.

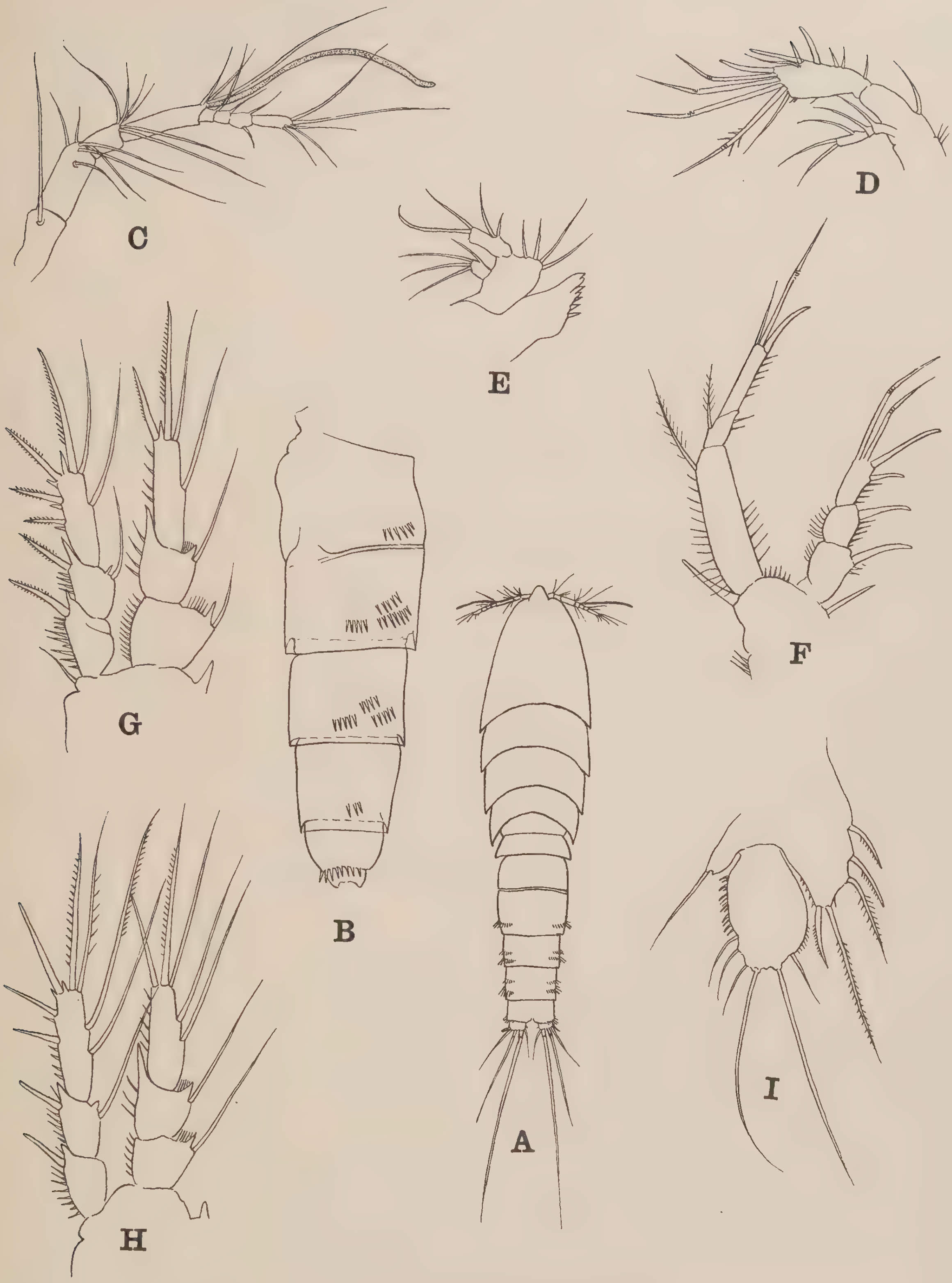
Occurrence.—Nankauri Harbour, Nicobar Islands, in weed-washings. Addu Atoll, Maldive Archipelago, in weed-washings.

Descriptive Notes.—♀. Total length, 0·70 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 64, A) are as 49 to 51. The anterior region is of slender build, and the abdomen tapers but little towards the posterior end. The proportional lengths of the segments of the posterior region are as follows :

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
12	37	19	18	11	3 = 100

The line of fusion of the 1st and 2nd segments of the abdomen is clearly indicated across the dorsal aspect. The various segments of the abdomen (Text-fig. 64, B) are armed with short rows of fine needle-like spines in the lateral region ; these are arranged, as Monard



Text-fig. 64.—*Amphiascus ctenophorus* Monard, ♀. A, Female, dorsal view. B, Abdomen, lateral view. C, 1st antenna. D, 2nd antenna. E, Mandible. F, 1st leg. G, 2nd leg. H, 3rd leg. I, 5th leg.

has shown, as follows: One row on each side in segment 1; 2 rows, one dorsolateral and the other ventrolateral, in segments 2 and 3; in the present specimens the dorsolateral row is double, whereas Monard figures it as single; one short, lateral row in segment 4; and a row of spinules along the articulation of the furcal ramus in segment 5. The furcal rami are about twice as long as broad.

The 1st antenna (Text-fig. 64, c) is composed of eight segments that have the following proportional lengths:

Segment	1.	2.	3.	4.	5.	6.	7.	8.
	20	21	11	21	4	6	6	11 = 100
(Monard) .	17	22	11	22	5	5	6	12 = 100

In the 2nd antenna (Text-fig. 64, D) the basal segment is slightly curved, and the distal segment is relatively short and bears three spines, four geniculate setæ, of which the posterior one is armed with several fine needle-like spinules, and a single simple seta. The exopod is composed of three segments; the 1st bears one seta distally, the second is small and is furnished with a seta, and the 3rd bears one seta on its anterior margin proximally and two at the distal end.

The mandibular palp (Text-fig. 64, E) is as described by Monard; the basal segment is enlarged and bears two unequal rami.

In the 1st leg (Text-fig. 64, F) both rami are three-jointed. The segments of the exopod are of approximately equal length; the 1st and 2nd are both devoid of an inner seta, and the 3rd segment bears two spines and two geniculate setæ. The endopod is long; the 1st and 2nd segments together equal the length of the whole exopod and each bears a single inner seta; the 3rd segment is more than twice the length of the 2nd, and bears at its distal end one curved spine, one geniculate seta and a delicate, simple seta.

Unfortunately, in the specimen dissected, the 4th pair of legs was missing; the setal formula of the 2nd and 3rd legs is as follows:

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P2	1	1	1, 2, 1	0	1	1, 2, 3
P3	1	1	2, 2, 1	0	1	2, 2, 3

The above formula differs slightly from that given by Monard, who states that the distal segment of the 3rd leg carries six setæ and spines, whereas in the present specimen (Text-fig. 64, H) there are seven.

In the 5th leg (Text-fig. 64, I) the basal segment reaches to about half-way along the distal segment; it is armed with five setæ, and the inner margin is fringed with fine hairs. The distal free segment is oval in shape and bears six setæ, of which one short one arises from the inner border, two subequal ones from the distal end and three short ones from the outer margin; the outer margin is fringed with fine hairs, and the distal third of the inner border is fringed with very small spinules. In Monard's examples the most proximal of the three setæ arising from the outer margin of the free segment is longer than the others.

DISTRIBUTION.—The Nicobar Islands and Maldive Archipelago (present record) and the Mediterranean Sea (Monard).

There is extremely little difference in structure between *Amphiascus rostratus* Gurney and *A. ctenophorus* Monard, as is shown in the following table :

	rostratus Gurney.	*ctenophorus* Monard.
Length	0·8 mm.	0·65 mm.
Rostrum	Long, equal to first two segments of 1st antenna	Long, equal to first two segments of 1st antenna.
Abdominal segments	With dorso-lateral groups of spinules	With dorso-lateral groups of spinules.
Length of segments of 1st antenna	1. 2. 3. 4. 5. 6. 7. 8. 20 23 11 18 4 7 5 12	1. 2. 3. 4. 5. 6. 7. 8. 17 22 11 22 5 5 6 12
Exopod of 2nd antenna	3-jointed	3-jointed.
1st leg	Endopod 1 longer than exopod Exopod 1 to 3 equal Endopod 1 equals endopod 2 and 3 in length Exopod 3 bears two spines and two geniculate setæ	Endopod 1 longer than exopod. Exopod 1 to 3 equal. Endopod 1 equals endopod 2 and 3 in length. Exopod 3 bears two spines and two geniculate setæ.
2nd–4th legs, setal formula	Endopod. Exopod. P2 1.1.1, 2, 1 0.1.1, 2, 3 P3 1.1.2, 2, 1 0.1.1, 2, 3 P4 1.1.1, 2, 1 0.1.2, 2, 3	Endopod. Exopod. P2 1.1.1, 2, 1 0.1.1, 2, 3 P3 1.1.2, 2, 1 0.1.1, 2, 3 P4 – 1.1, 2, 1 – – 2, 2, 3 (Complete data not given by Monard ; probably identical.)
5th leg	Basal joint produced nearly to end of distal segment. Basal segment narrow, bears five setæ, proximal one short. Distal segment broadly oval, 4 by 3.	Basal joint produced to about two-thirds of distal segment. Basal segment rounded, bears five setæ, proximal one short. Distal segment oval, 3 by 2.
Mandibular palp	Basal segment swollen, with two unequal lobes	Basal segment swollen, with two unequal lobes.
Habitat	Suez Canal	Mediterranean Sea.

Almost the only difference appears to lie in the slightly different shape of the 5th leg· In this respect the present specimens agree more nearly with *A. ctenophorus* than with *A. rostratus* ; but it may well be that all these forms are in reality merely local variations of a single species. Unfortunately, Gurney had no males for examination, and until specimens of this sex have been obtained and examined, it is not possible to reach any final conclusion on this point.

Incertæ sedis.

Amphiascus havelocki (Thompson and A. Scott).

Dactylophusia havelocki, Thompson and A. Scott, 1903, p. 269, pl. ix, figs. 11–18.

Occurrence.—Addu Atoll, Maldive Archipelago, in weed-washings ; a single female.

Distribution.—The Ceylon Pearl Banks (Thompson and A. Scott) and the Maldive Archipelago (present record).

Amphiascus dentatus (Thompson and A. Scott).

Dactylophusia dentata, Thompson and A. Scott, 1903, p. 268, pl. ix, figs. 1–10.

Occurrence.—Nankauri Harbour, Nicobar Islands, in surface tow-net; a single female.

Descriptive Notes.—♀. Total length, 0·76 mm.

This is somewhat smaller than Thompson and A. Scott's examples, which measured 1·2 mm. The proportional lengths of the anterior and posterior regions of the body are as 62 to 38. Viewed from the dorsal aspect the 3rd and 4th thoracic segments are both produced in sharp-pointed processes in the dorso-lateral region; the 5th thoracic segment is produced laterally in a blunt process on each side. The proportional lengths of the segments of the posterior region are as follows:

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
18	35	14	11	9	13 = 100

The genital segment bears a strong pointed process on each side of the antero-lateral area. The furcal rami are nearly twice as long as broad; the 2nd furcal seta is nearly one-and-a-half times as long as the posterior region of the body.

The 1st antenna is composed of eight segments.

The 2nd antenna is composed of three segments and the distal bears three spines and three geniculate setæ; the exopod is composed of only two segments, of which the proximal bears one and the distal four setæ, one on the anterior margin and three distally.

The 5th leg differs slightly form the figure given by Thompson and A. Scott (*loc. cit.*, pl. ix, fig. 7) for the distal segment is decidedly narrower in proportion to its length. It bears seven setæ and the proximal segment bears five.

Distribution.—The Nicobar Islands (present record) and the Ceylon Pearl Banks (Thompson and A. Scott).

Genus *Teissierella* Monard.

Teissierella, Monard, 1935, p. 24.
Robertsonia, Gurney, 1927*c*, p. 529.
The " Bulbifer " Group of *Amphiascus*, Monard, 1928*b*, p. 375.
Robertsonia, Lang, 1935, p. 4.

A considerable controversy has arisen regarding the position of the species that may be referred to this genus. Gurney (1927*c*, p. 529 *et seq.*) suggested that to the genus *Robertsonia* Brady can be referred a number of species that had previously been placed by other authors in the genus *Amphiascus*, and he further proposed to remove this genus from the Family Tachidiidæ, to which it has originally been attached, and include it in the Family Diosaccidæ near to the genus *Amphiascus*, to which it is clearly closely related. In the genus *Robertsonia* he included—

Robertsonia tenuis Brady, the type species.
R. bulbifer (Sars).
R. propinqua (T. Scott) (= *Amphiascus scotti* Sewell).
R. irrasa (A. Scott).
R. knoxi (Thompson and A. Scott) (=*Robertsonia diademata* Monard).

Of the other species that had up to that time been included in the genus, *R. normani* Brady is, he pointed out, an Ectinosomid, and *R. aculeifera* Klie is markedly different in its bodily shape and is probably identical with *Thompsonula hyenæ* Thompson. Since Gurney's paper other species have been added to the genus, namely :

Robertsonia chesapeakensis Wilson (1932),
R. flavidula Willey (1931),
R. hamata Willey (1931),

and to these may be also added *Amphiascus angolensis* Monard (1934).

Lang (1935*b*, p. 4) has clearly pointed out that *Robertsonia tenuis* possesses a genital aperture that in its structure resembles that of *Amphiascus* and not *Tachidius*, and that in the male the 1st antenna is also similar to that of *Amphiascus* ; and he agrees with Gurney that the genus *Robertsonia* should be classed with *Amphiascus* in the family Diosaccidæ.

Monard (1935, p. 24) has discussed the relationship of the genera *Robertsonia* and *Amphiascus*, and has described a new species which appears to bridge the already comparatively small difference between them ; to accommodate this new species he has erected a third genus, *Teissierella*. This genus is characterized by a large rostrum, articulated at its base ; the body with the same general form as in *Amphiascus* but rather short ; the 1st antenna short with only six segments in the type species (in other species the number ranges from five to seven) and furnished with pectinate spines ; the 2nd antenna with the exopod of three segments and bearing pectinate spines ; the mandibular palp with two lobes, but without the development of the genus *Stenhelia* ; all the limbs triarticulate. The 1st leg with the endopod elongate and prehensile only to a feeble degree ; in the swimming-legs the endopods shorter than the exopods. The 5th leg with two segments, of the form found in *Amphiascus*. In the male the antennule, the endopodite of the 2nd leg and the 5th leg are modified. Two ovigerous sacs.

To this genus Monard refers his new species *T. celtica*. In a later paper (1937, p. 30) he includes yet another new species, *T. salammboi*, and includes with this the species *T. knoxi* (=*Stenhelia knoxi* Thompson and A. Scott), which Gurney regards as probably identical with *Amphiascus diademata* Monard.

Almost the only definite distinguishing feature between the genera *Robertsonia* and *Teissierella* is the presence of one egg-sac in the former and two in the latter, as in *Amphiascus*. Brady (1880) in neither his account of *Robertsonia tenuis* nor the definition of the genus makes any reference to the number of egg-sacs, but Sars (1903–11, p. 335) states that the female is provided with only a single egg-sac. Lang (1935, p. 4) states, " Ich habe auch Sars' Material der Art erhalten. In diesem Material, welches über hundert Individuen umfasst, fehlen die Eiersäcke gleichfalle " ; thus the presence of two sacs in this species rests solely on Sars' work, but Wilson (1932, p. 29, pl. iv, A) has described a second species, *R. chesapeakensis*, in which also there is only a single egg-sac. It therefore seems to me preferable for the present at any rate and until more information is available to distinguish between these two groups of species, and to include those with one egg-sac in the genus *Robertsonia*, and the other with two egg-sacs in Monard's genus *Teissierella*.

The genus *Robertsonia* will thus include—

R. tenuis Brady and
R. chesapeakensis Wilson.

In the genus *Teissierella* Monard should be included—

- *T. celtica* Monard, the type of the genus.
- *T. salammboi* Monard.
- *T. propinqua* (T. Scott) (=*Amphiascus scotti* Sewell).
- *T. irrasa* (A. Scott).
- *T. knoxi* (Thompson and A. Scott) (=*Robertsonia salsa* Gurney).
- *T. hamata* (Willey).
- *T. flavidula* (Willey), and a new species.
- *T. angolensis* (Monard).
- *T. adduensis* sp. nov.

The position of Monard's species *R. diademata* must at present remain doubtful, as Monard does not state the number of egg-sacs; but it is probably a *Teissierella* and comes very near to *T. propinqua* and *T. irrasa*, since there appears to be no seta on the proximal segment of the endopods of the swimming-legs.

Throughout the genus we can trace a gradual reduction in the number of setæ that arise from the various segments of the rami in the swimming-legs. The highest degree of armature is to be found in *T. knoxi* (Thompson and A. Scott); in this species the setal formula is—

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P2	1	1	1, 2, 1	1	1	2, 2, 3
P3	1	1	3, 2, 1	1	1	2, 2, 3
P4	1	1	2, 2, 1	1	1	2 (or 3), 2, 3

The next stage is to be found in *T. propinqua* (T. Scott) and, so far as our knowledge goes, probably also in *T. irrasa* (A. Scott) and *T. diademata*, Monard, which Gurney believes to be identical with *knoxi*. Here the setal formula is:

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P2	1	1	1, 2, 1	0	1	2, 2, 3
P3	1	1	3, 2, 1	0	1	2*, 2, 3
P4	1	1	2, 2, 1	0	1	2, 2, 3

As regards *diademata*, Monard states that there is only one seta on the middle joint af all the endopods, but he figures two, the proximal very small, on the middle segment of the endopod of P3 (*vide* Monard, 1928*b*, fig. v, 1).

In the new species, *T. adduensis*, there is a further reduction by one seta on the terminal segment of the exopod of the 3rd leg; the formula thus becomes:

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P2	1	1	1, 2, 1	0	1	2, 2, 3
P3	1	1	3, 2, 1	0	1	1, 2, 3
P4	1	1	2, 2, 1	0	1	2, 2, 3

* Distal seta very small.

From this condition further reductions have taken place in either the terminal segment of the exopod of the 2nd leg, as in *T. hamata*, giving the formula :

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P2	1	1	1, 2, 1	0	1	1, 2, 3
P3	1	1	3, 2, 1	0	1	1, 2, 3
P4	1	1	2, 2, 1	0	1	2, 2, 3

or in the terminal segment of the endopod of the 3rd leg, as apparently in *T. angolensis* :

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P2	1	1	1, 2, 1	0	1	2, 2, 3
P3	1	1	1, 2, 1	0	1	2, 2, 3
P4	–	1	2, 2, 1	–	–	2, 2, 3

In the other species, *T. flavidula*, reduction has affected the setæ on the proximal segments of the endopod of the 2nd and 3rd legs :

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P2	1	1	1, 2, 1	0	1	2, 2, 3
P3	0	1	3, 2, 1	0	1	1, 2, 3
P4	0	1	1, 2, 1	0	1	2, 2, 3

The position of *Amphiascus bulbifer* Sars must at present remain doubtful ; Sars has not given a full description of the swimming-legs of this form, but he shows that it possesses the following setal formula for the 2nd leg, endopod 0. 2. 1, 2, 1 ; exopod 0. 1. 0, 2,3, which is entirely different from all other species that can be referred to this genus.

Teissierella knoxi (Thompson and A. Scott).

Stenhelia knoxi, Thompson and A. Scott, 1903, p. 262, pl. x, figs. 15–18.
Robertsonia salsa, Gurney, 1927*a*, p. 175, figs. 33–40.
Robertsonia knoxi, Gurney, 1927*c*, p. 532, fig. 147.
Teissierella knoxi, Monard, 1937, p. 30.

Occurrence.—Addu Atoll, Maldive Archipelago, in weed-washings ; examples of both sexes.

Descriptive Notes.—♀. Total length, 0·63 mm.

These examples are thus intermediate in size between the two forms obtained by Gurney in the Suez Canal, which measured respectively 0·87–1·0 and 0·45–0·50 mm.

The proportional lengths of the anterior and posterior regions of the body are as 50 to 50. The rostrum is bluntly rounded, and a small sensory hair springs from each side near the tip. The segments of the abdomen are richly ornamented with rows of small spinules, thus corresponding to Gurney's type A. The proportional lengths of the segments of the posterior region are as follows :

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
9	33	24	17	13	4 = 100

The 1st antenna consists, as Thompson and A. Scott pointed out, of six segments ; Gurney, in his account of *R. salsa*, stated that there were five segments, but in his later publication (1927*c*, p. 533) he admits that there is a partial separation of the last segment in the large form of this species and usually a complete separation in the smaller form. The proportional lengths of the segments are as follows :

Segment 1.	2.	3.	4.	5.	6.
34	14	20	6	9	17 = 100

At first sight these measurements differ markedly from those given by Thompson and A. Scott (1903, p. 262), but it is clear that in this instance these authors have given the measurements of the segments starting from the distal end instead of the proximal, so that by reversing the order and converting their figures to parts per hundred we get the proportional measurements of 28, 13, 23, 5, 10, 20, which agree reasonably closely with those given above. Gurney (1927*c*, p. 533) has called attention to the presence of a coarsely-feathered seta on the anterior margin of the terminal segment ; in the present specimen there were two such setæ present.

The 2nd antenna closely resembles that of *R. tenuis*.

The mandible, according to Gurney, also closely resembles that of *R. tenuis* ; this is true of the general shape of the appendage, but in the present specimen one of the setæ arising from the distal end of the basal segment of the palp is greatly enlarged and thickened.

The 1st leg agrees closely with the figure given by Thompson and A. Scott.

In the 2nd–4th legs the setal formula differs slightly from that given by Gurney, and is as follows :

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P2	1	1	1, 2, 1	1	1	2, 2, 3
P3	1	1	3, 2, 1	1	1	2, 2, 3
P4	1	1	2, 2, 1	1	1	3, 2, 3

On the distal segment of the exopod of the 4th leg there is a very minute seta on the distal side of the enlarged 2nd seta ; Gurney calls attention to the increased development of the 2nd seta on this segment, but either he failed to note the very small 3rd seta or else this was not present in his specimens.

The 5th leg of the present specimens differs somewhat from the figure given by Gurney (1927*b*, fig. 37, p. 177), for the proximal segment is shorter and more rounded, and the distal free segment is decidedly shorter and broader, and more nearly approaches the shape of this segment in *R. irrasa* A. Scott.

Distribution.—This species has now been recorded from the Ceylon Pearl Banks (Thompson and A. Scott), the Maldive Archipelago (present record), the Suez Canal (Gurney), the Mediterranean Sea (Monard) and Bermuda (Willey).

Teissierella propinqua (T. Scott).

Dactylopus propinquus, T. Scott, 1894, p. 99, pl. x, figs. 44–52; pl. xi, figs. 1–3.
Amphiascus scotti, Sewell, 1924, p. 819, pl. liv, 1.
Robertsonia propinqua, Gurney, 1927*c*, p. 530.

OCCURRENCE.—Nicobar Islands in weed-washings; one female. Addu Atoll, Maldive Archipelago, in weed-washings; several females.

DESCRIPTIVE NOTES.—♀. The specimens from Addu Atoll measured 0·87 mm. in total length; they were thus slightly larger than those from the Chilka Lake, that measured 0·79 mm.

These examples agree closely with the f. *major* from the Chilka Lake. A single specimen from the Nicobar Islands measured rather less in total length and conformed to f. *minor*.

DISTRIBUTION.—The Nicobar Islands (present record), the Chilka Lake (Sewell), the Maldive Archipelago (present record), the Suez Canal (Gurney), the Gulf of Guinea (T. Scott) and Bermuda (Willey).

Teissierella adduensis sp. nov. (Text-fig. 65, A–J.)

OCCURRENCE.—Addu Atoll, Maldive Archipelago, in weed washings.

DESCRIPTIVE NOTES.—♀. Total length, 0·64–0·66 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 65, A) are as 55 to 45. The proportional lengths of the segments of the posterior region are as follows:

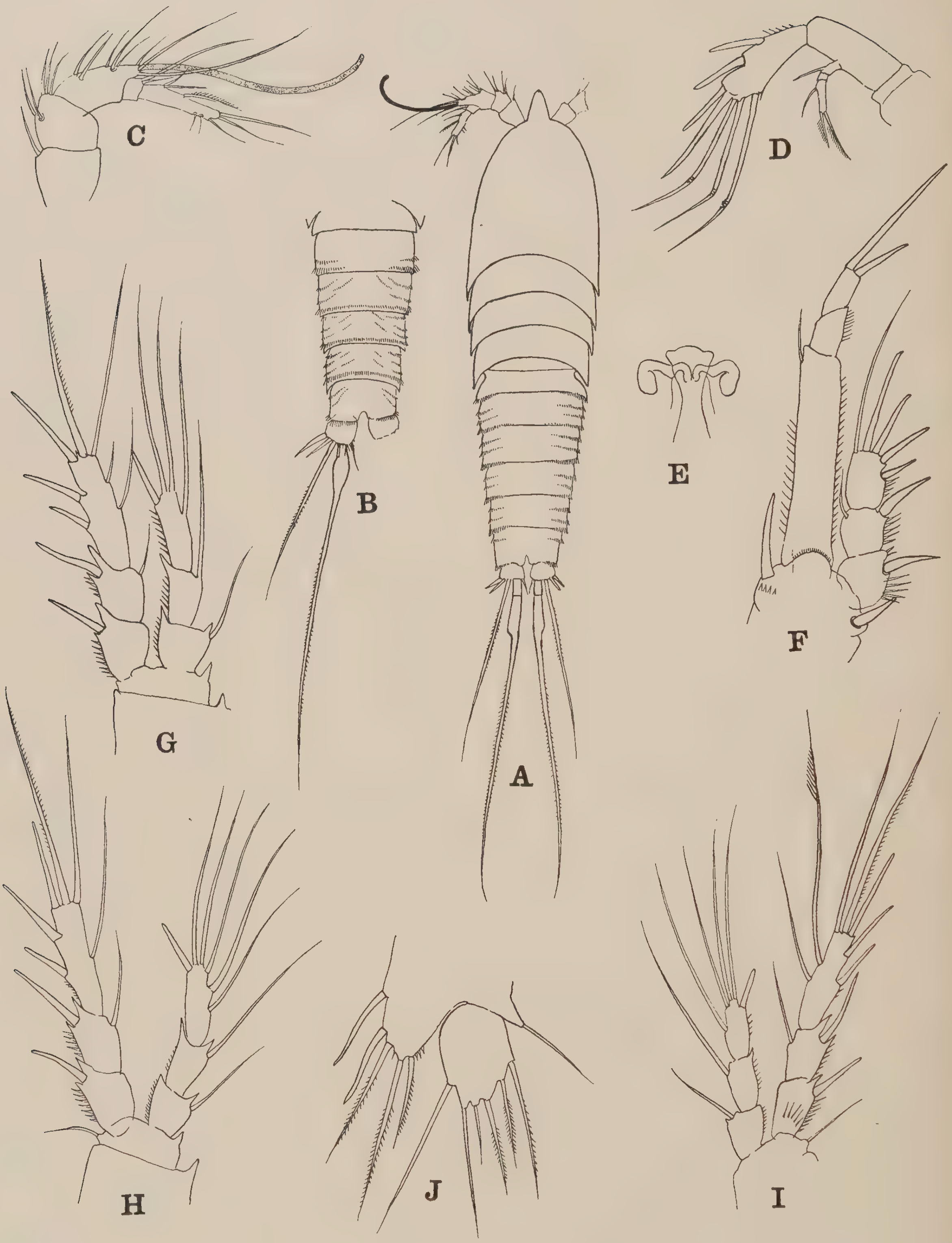
Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
10	32	17	17	14	10 = 100

The genital segment is crossed on the dorsal aspect by a well-marked line of demarcation between segments 1 and 2. All the abdominal segments are richly ornamented with rows of small spinules; there appears to be a certain degree of variation in the arrangement of these rows in different individuals; in some the posterior margins of all the abdominal segments and the lateral aspects of the segments bear three rows of minute spinules, which seem to disappear towards the mid-dorsal region; in other examples the rows of spinules along the posterior margins of the segments are continuous across the mid-dorsal line on the 2nd–4th segments and only the row on the 1st segment is interrupted, and there are subsidiary rows of minute spinules in the dorso-lateral regions that run somewhat forwards before disappearing near the mid-dorsal line. In the 5th segment the lines of articulation of the furcal rami are fringed with minute spinules. The furcal rami are slightly broader than long; each ramus is armed at the outer distal angle with a pair of delicate spines. The 2nd furcal seta is markedly thickened at the base; in some examples this thickening is cylindrical, while in others it is more or less pyriform.

The 1st antenna (Text-fig. 65, C) is composed of only five segments, that have the following proportional lengths:

Segment 1.	2.	3.	4.	5.
27	16	20	5	32 = 100

The 3rd segment bears a long sensory filament; the 4th segment is very short and the



Text-fig. 65.—*Teissierella adduensis* sp. nov. A, Female, dorsal view. B, Abdomen, dorsal view of another example. C, 1st antenna. D, 2nd antenna. E, Genital area, female. F, 1st leg. G, 2nd leg. H, 3rd leg. I, 4th leg. J, 5th leg.

5th is long. This latter segment bears a characteristic comb-like seta about the middle of the anterior border.

In the 2nd antenna (Text-fig. 65, D) the distal segment of the endopod is stout and comparatively short; it bears four spines and three geniculate setæ; the exopod is composed of three segments, the middle one, though clearly defined, is very small and is devoid of a seta.

In the 1st leg (Text-fig. 65, F) the exopod reaches a little more than half-way along the 1st segment of the endopod; all three segments are approximately equal in length. The endopod is twice the length of the exopod and the two distal segments are subequal.

The setal formula of the 2nd–4th pairs of legs (Text-fig. 65, G, H and I) differs from that of all the other members of the genus. It is as follows:

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P2	1	1	1, 2, 1	0	1	2, 2, 3
P3	1	1	3, 2, 1	0	1	1, 2, 3
P4	1	1	2, 2, 1	0	1	2, 2, 3

The absence of a seta on the proximal segment of the exopod in all the swimming-legs places this species close to *T. propinqua* (T. Scott) and *T. irrasa* (A. Scott); but the presence of only a single seta on the inner margin of the 3rd segment of the 3rd leg separates it from these two forms, in both of which there are two setæ in this position.

In the 5th leg (Text-fig. 65, J) the basal segment reaches to about half-way along the distal segment; it bears five setæ, of which the proximal two are smooth, as in *T. knoxi* and *T. propinqua*; the distal segment bears six setæ, of which the inner three are smooth.

DISTRIBUTION.—At present known only from the Maldive Archipelago.

Genus *Stenhelia* Boeck.

Stenhelia, Gurney, 1932, p. 38.

This genus is divided into two subgenera in accordance with the number of segments in the endopod of the 1st leg. Those species in which this ramus is composed of three segments are grouped in the subgenus *Stenhelia* s. str., whereas those in which only two segments are present comprise the subgenus *Delavalia*. In the present collections there are three species all belonging to the latter subgenus.

Subgenus *Delavalia* Brady.

Stenhelia (*Delavalia*) *polluta* Monard. (Text-fig. 66, A–D.)

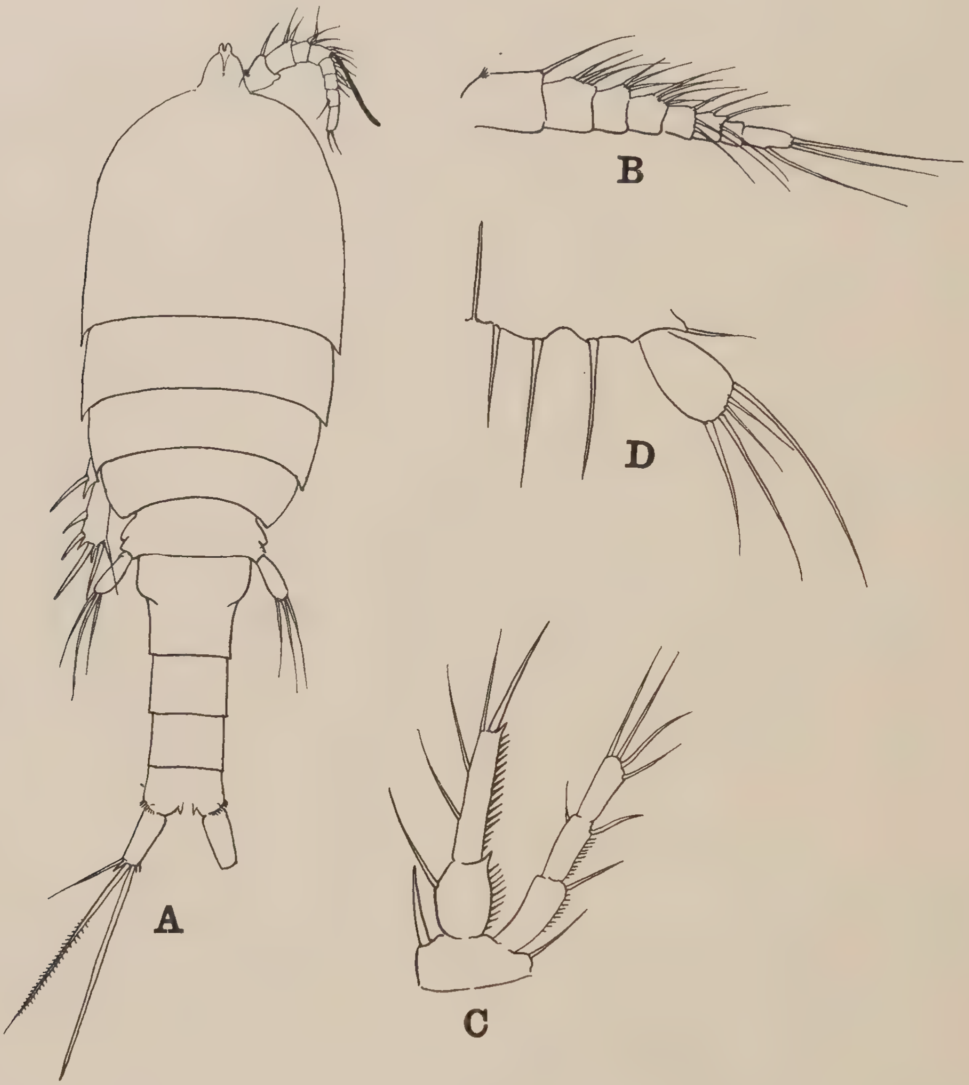
Stenhelia (Delavalia) polluta, Monard, 1928*a*, p. 399, fig. xxxv, 2.
Stenhelia normani var. *polluta*, Monard, 1937, p. 45.

OCCURRENCE.—Nankauri Harbour, Nicobar Islands, in weed-washings; a single female.

DESCRIPTIVE NOTES.—♀. Total length, 0·633 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig.

66, A) are as 56 to 44. The anterior region is robust. The rostrum resembles that of *S. normani* T. Scott, and terminates anteriorly in two small rounded lobes. The posterior region of the body is moderately wide in the 5th thoracic and 1st abdominal segments, but in the middle of the length of the genital segment, where the 1st and 2nd abdominal segments are fused, it becomes constricted, and behind this point is of almost uniform width as far as the furcal rami. The proportional lengths of the segments of the posterior region are as follows :



TEXT-FIG. 66.—*Stenhelia* (*Delavalia*) *polluta* Monard. A, Female, dorsal view. B, 1st antenna. C, 1st leg. D, 5th leg.

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
14	30	14	13	13	16 = 100

The posterior margin of the 5th segment, where the furcal rami are articulated, is armed with a row of fine needle-like spinules. The furcal rami are slightly divergent and are approximately twice as long as broad. In the present specimen they are slightly longer than in Monard's examples, being decidedly longer than the anal segment, whereas in the Mediterranean specimens they were of the same length.

The 1st antenna (Text-fig. 66, B) is composed of eight segments that decrease in length up to the 7th; the 8th is considerably longer than the preceding segment.

In the 1st leg (Text-fig. 66, C) the 2nd basal segment bears a delicate seta externally and a stout spine internally. The exopod is composed of three segments of nearly equal length; the 1st segment bears an outer seta-like spine, but has no inner seta; the 2nd segment bears an outer seta-like spine and an inner seta; and the 3rd segment bears four seta-like spines, the 4th arising from the inner distal angle. The endopod is composed of two segments only, bearing respectively one and four setæ.

The 5th leg (Text-fig. 66, D) has the usual form; the proximal segment is very broad, but is only slightly produced; it bears only three setæ. The distal segment is oval in shape and along the distal margin bears five setæ, of which the 2nd and 3rd, counting from the outer side, are small and delicate.

DISTRIBUTION.—Up to the present time this species has only been taken in the Mediterranean Sea (Monard) and in the Nicobar Islands (present record).

Monard first described this form as a separate species under the name *polluta*, but he has since come to consider it as a variation of *Stenhelia* (*Delavalia*) *normani* (T. Scott). *Stenhelia normani* itself was originally regarded as a variety of *Stenhelia giesbrechti* (T. Scott), but was subsequently given the status of a distinct species. The differences between a number of species of this genus are small, but the fact that on the proximal segment of the 5th foot in *S. polluta* there are only three setæ, whereas on this segment in *S. normani* there are four, seems to me sufficient grounds for regarding them as separate species, at any rate for the present.

Stenhelia (*Delavalia*) *truncatipes* sp. nov. (Text-fig. 67, A–E.)

OCCURRENCE.—Addu Atoll, Maldive Archipelago, in weed-washings; a single female.

DESCRIPTIVE NOTES.—♀. Total length, 0·445 mm.

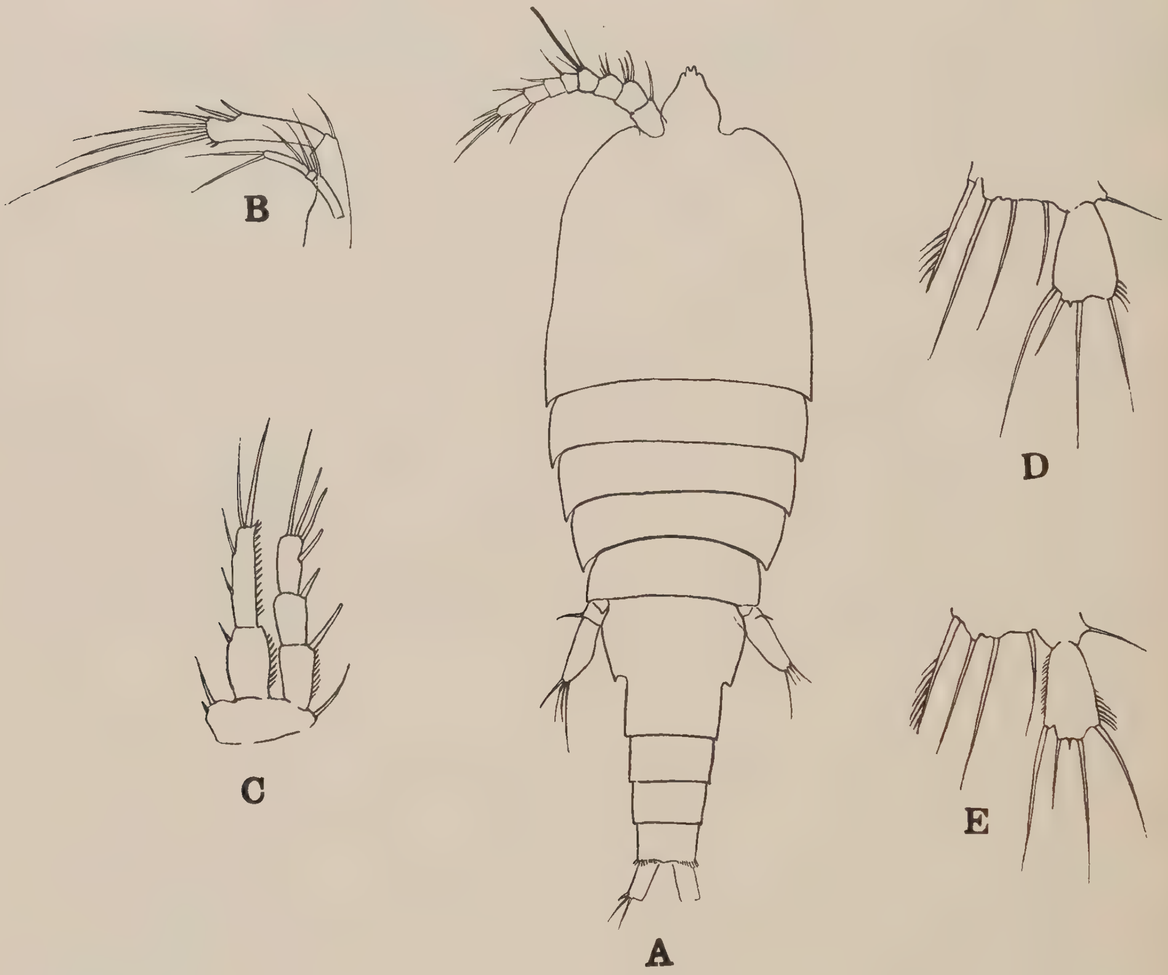
The proportional lengths of the anterior and posterior regions of the body (Text-fig. 67, A) are as 51 to 49. The anterior region is robust. The rostrum is pyriform in shape and at the anterior end is constricted, forming a pair of lateral rounded prominences, between which a pair of rounded prominences project forward as in *S. normani* T. Scott. The posterior region of the body is wide in front but is sharply constricted in the middle of the genital segment; behind this the abdomen tapers slightly to the posterior end. The posterior margins of the abdominal segments are devoid of spinules except along the line of articulation of the furcal rami with the anal segment, where a line of minute needle-like spinules runs across the dorsal aspect. The proportional lengths of the segments of the posterior region are as follows:

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
15	29	18	14	11	13 = 100

The furcal rami are twice as long as broad and are slightly divergent.

The 1st antenna is short, reaching back only about half the length of the cephalosome ; it consists of eight segments, but, as Monard (1928*a*, p. 398) has noted in *S. magnacaudata*, the separation of the distal three segments is incomplete.

The 2nd antenna (Text-fig. 67, B) consists of two, somewhat slender segments, of which the distal bears three delicate spines on its anterior margin, the proximal two arising close together, while a fourth spine arises from the distal anterior angle. The exopod is slender and is composed of three segments, of which the 2nd is very small but bears a seta ; two setæ spring from the extreme distal end of the terminal segment and one from its anterior margin near its base.



Text-fig. 67.—*Stenhelia* (*Delavalia*) *truncatipes* sp. nov. A, Female, dorsal view. B, 2nd antenna. C, 1st leg. D, 5th leg. E, 5th leg of another specimen.

In the 1st leg (Text-fig. 67, C) the 2nd basal segment bears a delicate seta on its outer margin and a delicate straight spine on the inner distal angle. The two rami are approximately equal in length ; the exopod is composed of three segments, of approximately equal length, and of these the first two each bear a marginal spine but have no inner seta, and the distal segment bears three external spines and a long spine-like seta. The endopod consists of two segments only of nearly equal length ; the proximal segment bears a single very small seta on its inner border, and the distal carries two small inner setæ and two longer and unequal ones distally.

In the 5th leg (Text-fig. 67, D and E) the proximal segment is wide and but little produced; it bears four setæ, of which the 1st or outermost arises at some distance from the 2nd, instead of close to it as in *S. giesbrechti* and *S. normani*. The 4th or innermost seta is comb-like. The distal segment is rather longer than broad, and its distal margin is truncated; it varies somewhat in shape, and in one form resembles the corresponding appendage of *S. giesbrechti* fairly closely; a moderately long seta arises at the distal outer angle; from the truncated distal border three setæ arise, of which the outermost is long, the next extremely short and almost completely suppressed in some individuals, and the inner seta is about half the length of the outer; a fifth seta arises from the inner margin near the distal end.

Distribution.—At present known only from the Maldive Archipelago.

Stenhelia (*Delavalia*) *latisetosa* sp. nov. (Text-fig. 68, A–E.)

Occurrence.—Addu Atoll, Maldive Archipelago, in weed-washings; a single female.

Descriptive Notes.—♀. Total length, 0·491 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 68, A) are as 56 to 44. The anterior region of the body is robust. The rostrum is wide at the base, but at about the middle of its length it is sharply constricted, forming on each side a very definite shoulder, and from then to the end it tapers to a blunt point. The posterior region is wide anteriorly, but at the level of fusion of the 1st and 2nd abdominal segments is constricted, and behind this tapers only slightly to the posterior end. The proportional lengths of the segments of the posterior region are as follows:

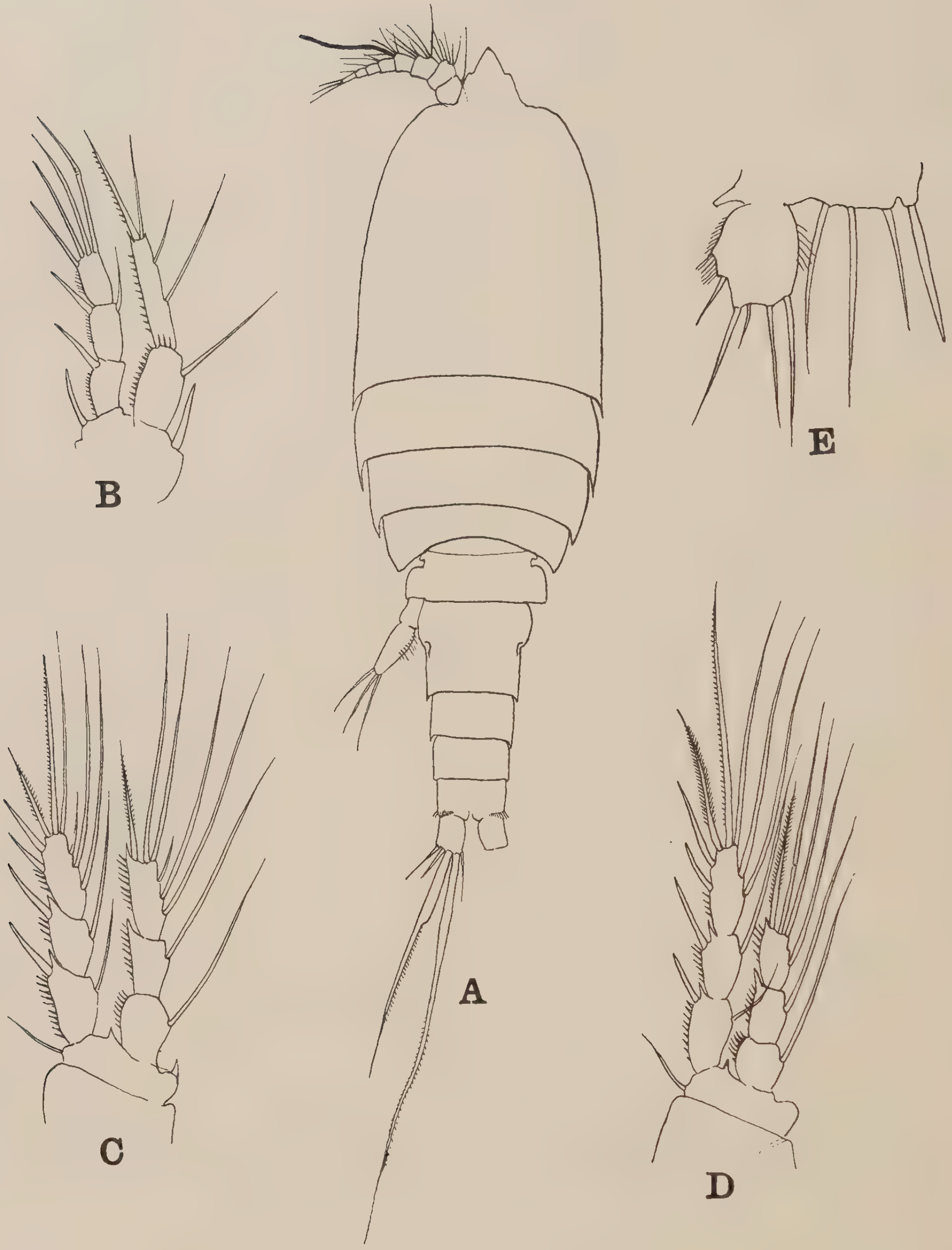
Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
16	34	17	12	11	10 = 100

The abdominal segments are unarmed except for a line of fine needle-like spines that runs across the dorso-lateral aspect of the anal segment close to and parallel with the articulation of the furcal rami. The furcal rami are about one-and-a-third times as long as wide. Each ramus bears five setæ; the innermost is short and slender; the 2nd is equal in length to the anterior region of the body less the rostrum and is thickened at its base, its proximal third is smooth but the distal two-thirds are feathered; the 3rd seta is markedly swollen in the basal third of its length, and the distal two-thirds are feathered on one side only; the 4th and 5th setæ are short and spine-like.

The 1st antenna has the usual characters, and consists of eight segments of more or less equal length.

In the 1st leg (Text-fig. 68, B) the exopod consists of three approximately equal segments, of which the 1st and 2nd each bear a single marginal spine and the 2nd segment bears a single inner seta; the 3rd bears three spines and a geniculate seta. The endopod consists of two segments only, the distal being somewhat longer than the proximal and reaching to a little beyond the end of the exopod; the proximal segment bears a single seta on the inner margin and the distal bears two unequal setæ, the distal being small, on the inner margin and a seta and a serrated spine at the distal end.

In the swimming-legs (Text-fig. 68, C and D) the 3rd possesses equal rami, but in the



Text-fig. 68.—*Stenhelia* (*Delavalia*) *latisetosa* sp. nov. A, Female, dorsal view. B, 1st leg. C, 3rd leg. D, 4th leg. E, 5th leg.

4th the endopod is very much shorter than the exopod. The setal formula of these two legs is as follows:

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P2	Not seen.					
P3	1	1	3, 2, 1	1	1	3, 2, 3
P4	1	1	2, 2, 1	1	1	2, 2, 3

The 3rd seta on the inner margin of the distal segment of both the endopod and exopod of the 3rd leg is markedly reduced in size.

In the 5th leg (Text-fig. 68, E) the proximal segment is wide but is hardly at all produced; it bears four setæ, of which the inner two arise close together and the innermost is straight and spine-like, as in *S. giesbrechti*. The distal segment is sub-quadrate in shape; a short seta arises about two-thirds of the way along the outer margin; three setæ, of which the middle one is short and delicate, arise from the distal margin, and a single seta springs from the distal inner angle. On the outer margin, about half-way along its length and proximal to the point of origin of the outer seta, there is a small notch in the border, and it is possible that a sixth seta arises from this point.

Distribution.—The Maldive Archipelago.

Within the subgenus *Delavalia* it is possible to trace a gradual reduction in the number of setæ that are borne by the terminal segments of the rami of the swimming-legs. In the following table I have arranged the various forms, of which we have sufficient data, in a gradually descending scale:

	Number of setæ on the terminal segments.					
	Endopod.			Exopod.		
	P. 2.	P. 3.	P. 4.	P. 2.	P. 3.	P. 4.
giesbrechti	4	6	5	7	8	8
magnacaudata	4	6	5	7	8	8
reflexa	4	6	5	..	8	8
polluta	4	6	5	7	8	7
latisetosa	..	6	5	..	8	7
minutissimus	4	6	5	6	8	8
pallustris	4	6	4	6	7	6
acutirostris	4	5	4	7	8	8
tethysensis	4	5	4	6	7	7
minuta	4	4	4	6	7	7
normani	4	3	..	7	7	7

A similar reduction can be traced in the number of setæ that arise from the two segments of the 5th foot :

	Number of setæ on the segments of P. 5.	
	Proximal.	Distal.
reflexa	5	6 (Sars, Wilson)
magnacaudata	5	5
arctica	4	6
arenicola	4	6
longicaudata	4	6
minutissima	4	6
palustris	4 (or 3)	6 (Sars, Brady)
latisetosa	4	5 (? 6)
giesbrechti	4	5
inopinata	4	5
normani	4	5
tethysensis	4	5
truncatipes	4	5 (middle one very small)
reflexa	4	4 (Brady)
polluta	3	5
minuta	3 (or 2)	5 (Gurney, A. Scott)

It is interesting to note that the reduction in the number of setæ on the limbs appears to start in the most posterior pair, commencing with *reflexa*, in which we get the maximum number of five and six on the two segments, and steadily progressing to *minuta*, in which we find only three (or even two) and five.

The form *acutirostris* was described by Willey (1935, p. 95, figs. 174–179) as a form of *normani* (T. Scott), but as the setal formula is different and there are other differences in the 2nd leg of the male, it seems to me that it should be regarded as a distinct species.

It is also interesting to note that certain differences, in addition to the reduction of the number of setæ, such as the greater reduction of the maxilliped to the extent of the complete loss of the terminal claw, and the reduction of the number of segments in the 1st antenna to 7 or even 6, owing to the imperfect separation of the terminal joints, emphasizes the separation of the species *palustris* from the other species.

Family CANTHOCAMPTIDÆ.

Genus *Ameira* Boeck, Sars.

This genus, established by Boeck (1865), was redefined by Sars (1903–11). Thompson and A. Scott (1903) recorded the occurrence of *Ameira minor* and *A. tenuipes* on the Ceylon Pearl Banks ; A. Scott (1909) described a new species, *A. sibogæ*, from the Malay Archipelago ; Gurney (1927*c*) reported the presence of *Ameira parvula* Claus (=*A. tau* (Giesbrecht)) and *Ameira scotti* Sars from the Suez Canal. In my opinion this last species is synonymous with *A. sibogæ* A. Scott, this name having priority.

Ameira parvula (Claus).

Ameira tau, Giesbrecht, 1881, p. 117, pl. i, figs. 9–13; Sars, 1903–11, p. 218, pl. cxliii; Monard, 1928*a*, p. 405, fig. xxxvi, 4; Wilson, 1932, p. 245, fig. 163.
Ameira parvula, Brian, 1926, p. 248; Gurney, 1927*c*, p. 545.

Occurrence.—Addu Atoll, Maldive Archipelago, in weed-washings; a single female.

Descriptive Notes.—♀. Total length, 0·454 mm.

This is slightly smaller than the measurement given by Sars, namely 0·5 mm., but larger than those taken by Brian in the Mediterranean Sea.

Distribution.—The Maldive Archipelago (present record), Suez Canal (Gurney), Mediterranean Sea (Brian, Monard), the Adriatic (Pesta), Bermuda (Willey), the East coast of America, Wood's Hole (Wilson), the west coast of Ireland (Farran), the Brittany coast, Roscoff (Monard), Kiel Bay (Giesbrecht) and the coast of Norway (Sars).

Genus *Nitocra* Boeck.

Nitocra spinipes Boeck var. *orientalis* Sewell.

Nitocra spinipes var. *orientalis*, Sewell, 1924, p. 827, pl. lvi, fig. 1.

Occurrence.—Pamban, Rameswaram Island, S. India, in weed-washings; several examples, including ovigerous females.

Distribution.—The typical form has a wide distribution and has been recorded from the Salt Basins of Ain-el Merouah, Syria (Richard), the Suez Canal (Gurney), the Adriatic (Pesta), the east coast of America, Wood's Hole (Wilson), the Scottish coast (T. Scott), the coast of England (Gurney), the English Channel, Roscoff (Monard), the North Sea, Cuxhaven (Klie), the Baltic Sea (van Douwe, Jakubisiak, Klie, Kunz), the coast of Norway (Sars) and Nova Zembla (T. Scott). The variety *orientalis* has now been taken in the Chilka Lake and off the south Indian coast (Sewell) and in salt pools by the Bitter Lakes, Egypt (Gurney).

Genus *Leptomesochra* Sars.

Leptomesochra, Sars, 1903–11, p. 418.

In his definition of the genus Sars gives as one of the characters " Rostrum obsolete "; among the collections made by washing weed from Addu Atoll, Maldive Archipelago, was a single specimen of a form that agrees in all other characters with the description of this genus, but in this individual there is a well-developed rostrum. It thus appears necessary to amend the definition to " Rostrum present or obsolete ".

Leptomesochra nasuta sp. nov. (Text-fig. 69, a–h.)

Occurrence.—Addu Atoll, Maldive Archipelago, in weed-washings; a single female.

Descriptive Notes.—♀. Total length, 0·55 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 69, a) are as 44 to 56. The body has the characteristic linear form, being of nearly the same diameter throughout. At the anterior end is a large pyriform rostrum, that tapers to a bluntly-rounded point. The proportional lengths of the segments of the posterior region of the body are as follows:

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
7	32	17	17	21	6 = 100

The abdominal segments are devoid of armature. The furcal rami are nearly as long as broad; the 2nd furcal seta is equal in length to the whole abdomen, and the 3rd seta is about one-third this length.

The 1st antenna (Text-fig. 69, B) is long and slender, and is composed of nine segments that have the following proportional lengths:

Segment	1.	2.	3.	4.	5.	6.	7.	8.	9.
	20	26	16	13	5	7	3	3	7 = 100

The 2nd antenna (Text-fig. 69, C) consists of three main segments, but at the extreme end of the third segment there appears to be a small subsidiary joint. This small additional joint carries one spine and a single geniculate seta, and from the distal end of the 3rd segment spring another geniculate seta and a straight seta. Such a structure at the extreme tip of the 2nd antenna is, in my experience, quite unique; unfortunately, it is impossible to determine whether the condition is normal or is the result of an injury; I incline to the latter view. The exopod consists of a single segment bearing two setæ distally.

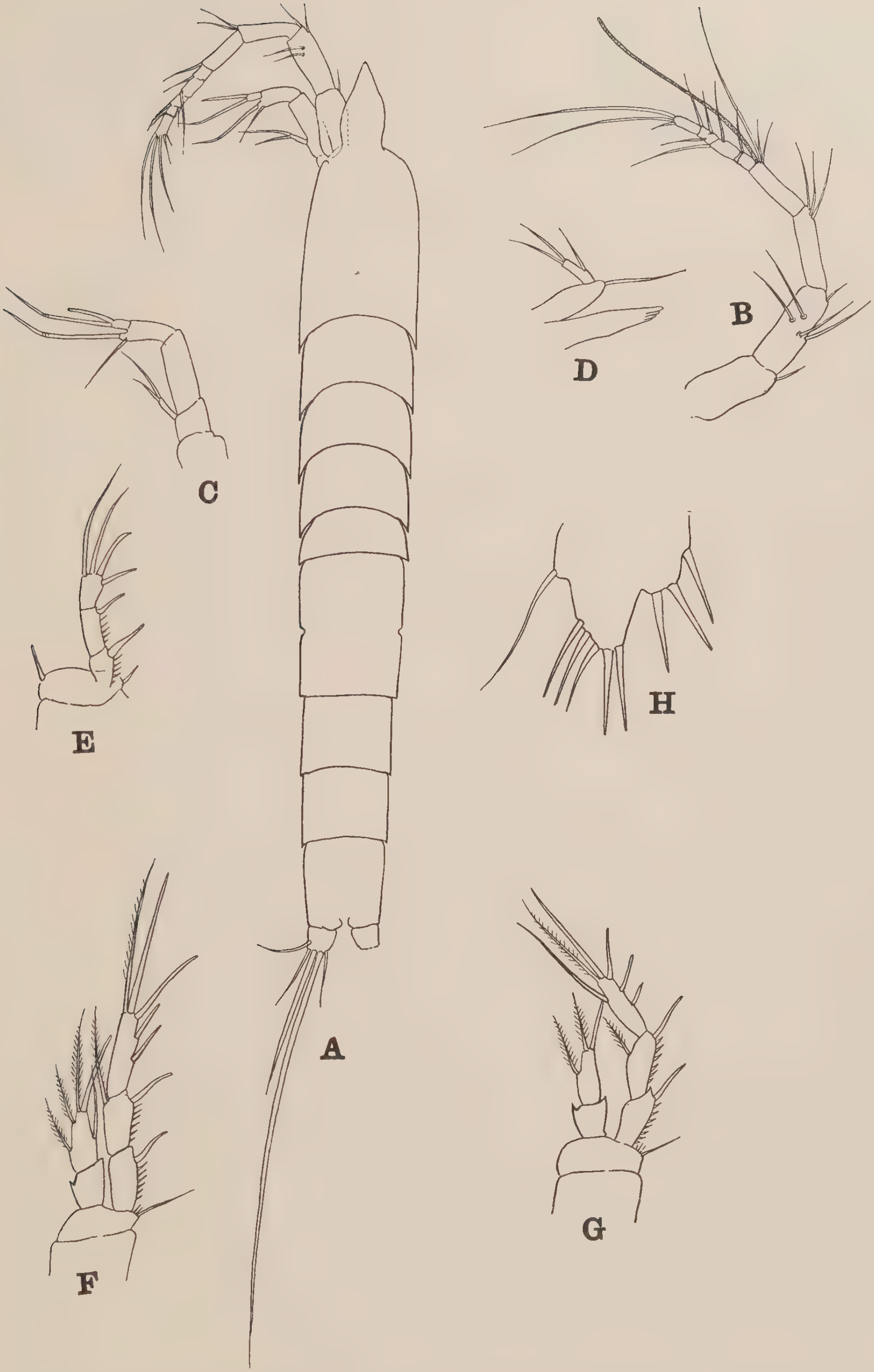
The mandible (Text-fig. 69, D) differs somewhat from that of *Leptomesochra confluens* Sars. The tooth-plate bears several small, rounded teeth, set close together and forming a sloping edge; the palp is composed of a well-developed basal segment, which bears a single seta distally, and a single-jointed ramus, bearing three setæ.

In the 1st leg (Text-fig. 69, E) the endopod was unfortunately missing on both sides. The exopod is composed of three segments; the 1st and 2nd segments are fringed along their outer borders with delicate spinules, and each bears a marginal spine but no inner seta; the 3rd segment bears two spines and two setæ.

In the 2nd leg (Text-fig. 69, F) the exopod is composed of three segments and the endopod of two. In the exopod the 1st segment bears a marginal spine but has no inner seta, and the 2nd segment possesses both a marginal spine and a seta; the outer border of these two segments is fringed with spinules. The 3rd segment bears three marginal spines, an end-spine and a single seta. The endopod reaches to the level of the distal end of the 2nd segment of the exopod; on the inner border of the proximal segment is a small spine-like projection but no seta, as in *L. confluens* Sars; the distal segment bears two setæ on the inner border, one seta and one spine at the distal end and a seta on the outer border.

In the 4th leg (Text fig. 69, G), which also closely resembles that of *L. confluens*, the exopod is three-jointed and the endopod has two segments instead of three, but from this distal portion arise a single seta near the middle of the inner margin and one seta and a spine from the distal border.

In the 5th leg (Text-fig. 69, H), as in *L. confluens*, the distal segment is not separated off; the limb is thus composed of two lobes, from the outer of which three setæ spring from the outer margin and two spines from the distal end, while from the inner lobe, which is but little produced, arise three subequal spines, instead of four, as in *L. confluens*.



TEXT-FIG. 69.—*Leptomesochra nasuta* sp. nov. A, Female, dorsal view. B, 1st antenna. C, 2nd antenna. D, Mandible. E, 1st leg. F, 2nd leg. G, 4th leg. H, 5th leg.

In spite of the presence of a well-developed rostrum this example agrees so closely in other respects with *Leptomesochra confluens* Sars that I have no hesitation in referring it to the same genus.

Distribution.—At present known only from Addu Atoll, Maldive Archipelago.

Genus *Phyllopodopsyllus* T. Scott.

Phyllopodopsyllus furcifer Sars. (Text-fig. 70, A–I.)

Phyllopodopsyllus furcifer, Sars, 1903–11, p. 233, pl. clvi.

Occurrence.—Sta. 45, South Arabian Coast, dredge, 40 m., in mud; a single female.

Descriptive Notes.—♀. Total length, 0·80 mm.

The general body-form (Text-fig. 70, A) is moderately slender; the head and 1st thoracic segment are fused, and the combined cephalosome is equal in length to the next four segments. The 1st and 2nd segments of the abdomen are fused, but there is a distinct trace of the line of fusion in the lateral region; the genital aperture bears a finger-like process. The 2nd free segment (segment 3) is produced backwards on the ventral side so as to overlap segment 4 by about half its length. The furcal rami (Text-fig. 70, B) are nearly twice as long as the anal segment and are nearly twice as long as broad; the inner margin is convex and is furnished with a few hairs. The 2nd furcal seta is considerably dilated at its base.

The 1st antenna (Text-fig. 70, C) is not as long as the cephalosome and is composed of 8 segments that have the following proportional lengths:

Segment	1.	2.	3.	4.	5.	6.	7.	8.
	37	12	10	8	6	6	6	15 = 100

The 1st segment is thus more than one-third the length of the whole appendage. The 2nd segment is produced in a strong spine on its posterior aspect.

The 2nd antenna (Text-fig. 70, D) possesses three segments, which are about equal in length; the terminal segment bears three spines, of which the distal is long and slender, three geniculate setæ and one simple seta. The proximal segment bears a row of spinules on its anterior margin. The exopod is composed of a single segment bearing three setæ.

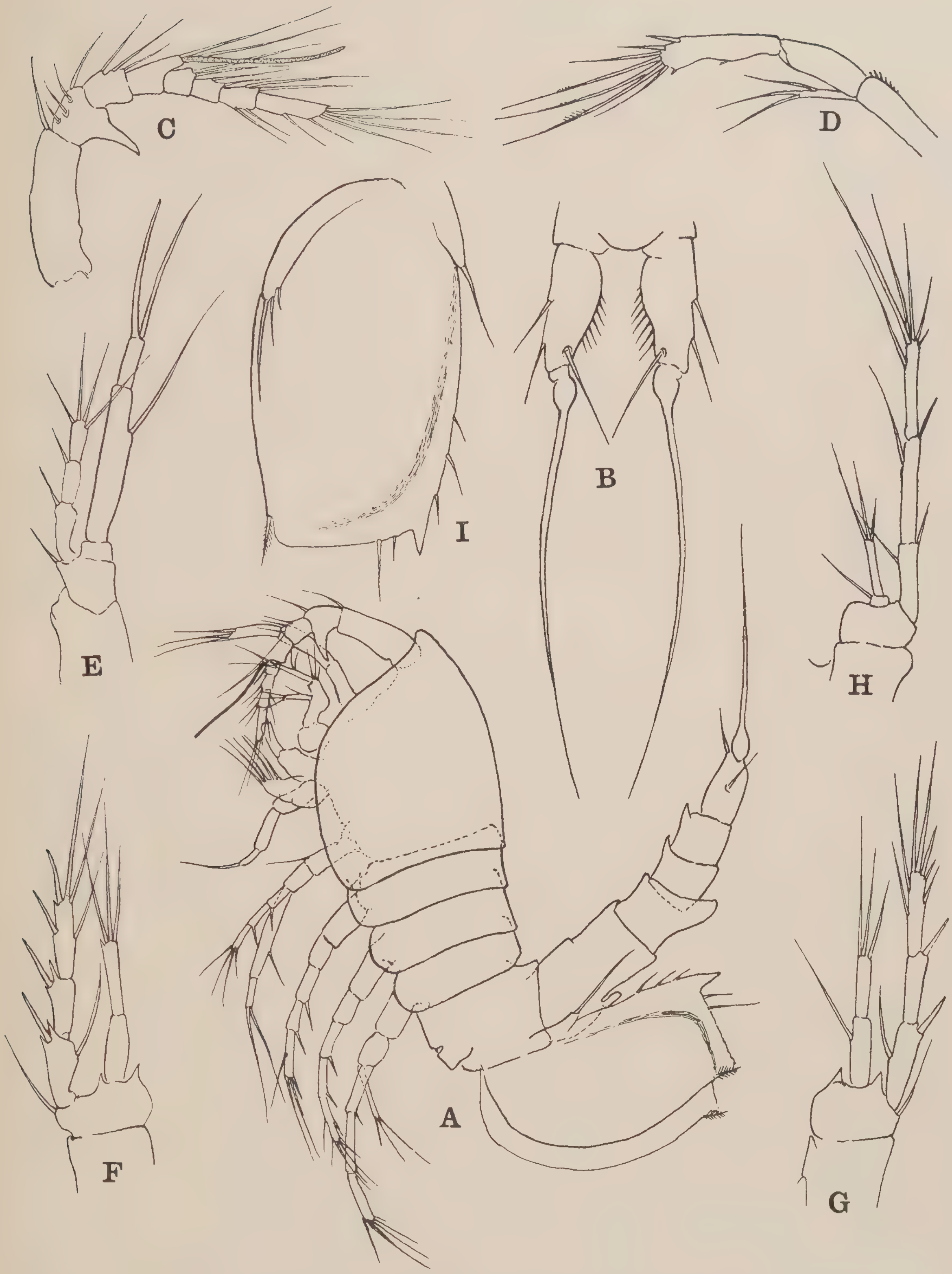
The mandibular palp is biramous; each ramus is composed of a single slender joint.

The maxillæ and maxilliped resemble those of *P. bradyi* T. Scott.

In the 1st leg (Text-fig. 70, E) the exopod is composed of three segments that are subequal in length, and the whole ramus is shorter than the proximal segment of the endopod. The endopod is composed of two segments only, of which the distal is more than one-third the length of the proximal.

In the 2nd–4th legs (Text-fig. 70, F, G and H) the endopod is composed of only two segments. The setal formula is as follows:

	Endopod.		Exopod.		
	1.	2.	1.	2.	3.
P2	0	0, 2, 1	1	0	1, 2, 2
P3	1	0, 2, 1	1	0	2, 2, 3
P4	1	0, 2, 1	1	1	2, 2, 2



Text-fig. 70.—*Phyllopodopsyllus furcifer* Sars, ♀. a, Female, lateral view. b, Furcal rami. c, 1st antenna. d, 2nd antenna. e, 1st leg. f, 2nd leg. g, 3rd leg. h, 4th leg. i, 5th leg.

In each succeeding leg the endopod becomes progressively shorter; in the 2nd leg it reaches to the middle of exopod 3, in the 3rd to the end of exopod 2 and in the 4th to the end of exopod 1.

In the 5th leg (Text-fig. 70, I) the appendage forms a wide flap; Sars figures a small plumose seta as arising from the extreme distal angle of this plate, whereas in the present specimen it arises at a short distance on the proximal side of the angle. I can detect no other difference between the present specimen and the description and figures given by Sars.

Distribution.—Up to the present time this species has been recorded only from the Norwegian coast (Sars); its occurrence in the present collection extends its range to the Indian Ocean.

Thompson and A. Scott (1903), in their account of the Copepoda of the Ceylon Pearl Banks, recorded two species which they attributed to the genus *Tetragoniceps*, viz. *T. dubia* and *T. minor*. Of these the latter, however, clearly belongs to the genus *Phyllopodopsyllus* Sars. A. Scott (1909, p. 223) recorded a male *Phyllopodopsyllus*, *P. longicaudatus*, from the Malay Archipelago, and he remarked that this might possibly be the male of *P. minor*, but differed from the female in certain small characters. Both *P. minor* and *P. longicaudatus* have since been taken by Willey off Bermuda, both sexes being represented in each species. It thus seems highly probable that before long *P. longicaudatus* will be found in Indian waters in addition to the species *P. furcifer* Sars and *P. minor* (Thompson and A. Scott).

Family LAOPHONTIDÆ.

Genus *Laophonte* Philippi.

Although they form a comparatively homogeneous group, the species of this genus, of which according to Monard there were in 1935 some 86 species, exhibit a considerable diversity of structure, especially in the character of the 1st and 2nd antennæ, the exopod of the 1st leg, the setal formula of the 2nd–4th legs and the number of setæ that spring from the two lobes of the 5th leg. So great are these differences that in other genera they would be considered sufficient grounds for the creation of several subgenera, or even for the division of the group into separate genera.

In a number of species the published descriptions are, unfortunately, inadequate, especially as regards the number and arrangement of the setæ on the swimming-legs; but in spite of gaps in our knowledge it is possible to arrange most, if not all, of the known species in groups according to definite anatomical characters, and in the following pages I have attempted to do so. It must, however, be recognized that such an arrangement does not of necessity indicate close relationship between individuals in the same group; but it will, I hope, prove of considerable assistance in the identification of any given form.

The number of segments in the exopod of the 1st leg ranges from 1 to 3, thus furnishing a basis for the separation of three corresponding groups.

Group I.—The exopod of the 1st leg consists of three segments.

In this group the number of segments in the 1st antenna ranges from six to eight.

(i) Species with 8 segments in the 1st antenna:

A. With 6 setæ on both the inner and outer segment of the 5th leg:

Laophonte varians Brady.

B. With 6 setæ on the outer and 4 on the inner segment of the 5th leg :

Laophonte gurneyi Lang (= *L. meinerti* Gurney (*non* Brady)).

(ii) Species with 7 segments in the 1st antenna :

A. Species with 7 setæ on the outer and 5 on the inner segment of the 5th leg :

Laophonte parvula Sars.

B. Species with 6 setæ on the outer and 7 on the inner segment of the 5th leg :

Laophonte longiremis T. Scott.

C. Species with 6 setæ on both the outer and inner segments of the 5th leg :

Laophonte wiltoni T. Scott.

D. Species with 6 setæ on the outer and 5 on the inner segment of the 5th leg :

These species can be subdivided according to the setal formula of the exopods of the 2nd to 4th legs :

(*a*) Setal formula as follows :

	Exopod.		
	1.	2.	3.
P2	0	1	1, 2, 3
P3	0	1	2, 2, 3
P4	0	1	2, 2, 3

Laophonte campbellensis Lang.
L. oculata Gurney.
L. parvuloides Monard.
L. serrata (Claus) (=*L. propinqua* T. Scott).

(*b*) Setal formula as follows :

	Exopod.		
	1.	2.	3.
P2	0	1	1, 2, 3
P3	0	1	1, 2, 3
P4	0	1	1, 2, 3

Laophonte littoralis T. Scott.
L. proxima Sars.
L. strömi (Baird).

Willey (1929, p. 5, figs. 2, 3 and 5) has very incompletely described a form from St. Andrews, New Brunswick, which he claims to be the local representative of the Norwegian species, *L. strömi* (Baird); to this form he has given the name *L. discophora*, and it may perhaps be included in this group, but until a fuller description has been published its definite place must remain unsettled.

(*c*) Setal formula as follows:

	Exopod.		
	1.	2.	3.
P2	0	1	1, 2, 3
P3	0	1	1, 2, 3
P4	0	0	1, 2, 3

Laophonte abbreviata Sars.

The setæ on the inner margins of exopods 2 and 3 in all the legs are greatly reduced in size and are obsolescent.

(*d*) Setal formula as follows:

	Exopod.		
	1.	2.	3.
P2	0	1	1, 2, 3
P3	0	1	1, 2, 3
P4	0	0	0, 2, 2

Laophonte minuta Boeck.

(*e*) Setal formula as follows:

	Exopod.		
	1.	2.	3.
P2	0	1	0, 2, 3
P3	0	1	0, 2, 3
P4	0	1	0, 2, 3

Laophonte tenuispina Lang.

Other species, in which the 1st antenna is composed of seven segments and in which there are six setæ on the outer and five on the inner segment of the 5th leg, must also be included in this group; but as the setal formula of the 2nd–4th legs has not been recorded, it is impossible to place them in their respective sub-groups, namely:

Laophonte gracilipes Brady.
L. insignis T. Scott.
L. rottenburgi T. Scott.

E. Species with 6 setæ on the outer and 3 on the inner segment of the 5th leg :

Laophonte applanata Sars.
L. depressa T. Scott.

F. Species with 5 setæ on the outer and 6 on the inner segment of the 5th leg :

Laophonte australis T. Scott.
L. glacialis Brady.

G. Species with 5 setæ on both the outer and inner segments of the 5th leg :

Laophonte dinocerata Monard.
L. gracilis T. Scott.
L. inornata A. Scott (according to Norman and T. Scott).
L. koreni Boeck.
L. longicaudata Boeck.
L. sima Gurney.
L. taurina Monard.
L. typhlops Sars.

H. Species with 5 setæ on the outer and 4 on the inner segment of the 5th leg :

Laophonte baltica Klie.
L. congenera Sars.
L. curticauda Boeck.
L. faroënsis T. Scott.
L. inornata A. Scott.
L. meinerti Brady.

I. Species with 5 setæ on the outer and 2 on the inner segment of the 5th leg :

Laophonte quaterspinata Brian.

J. Species with 4 setæ on the outer and 5 on the inner segment of the 5th leg :

Laophonte exigua Sars.
L. sporadiensis Brian.

(iii) Species with 6 segments in the 1st antenna :

A. Species with 6 setæ on the outer and 5 on the inner segment of the 5th leg :

Laophonte dominicalis Monard.
L. manifera Wilson.
L. pilosa Car.

Possibly *L. dominicalis* Monard should be placed in Group I, (ii), D, as Monard states that there is an indistinct line of separation across the last segment of the 1st antenna, which, if complete, would give this appendage 7 segments instead of 6.

B. Species with 5 setæ on the outer and 4 on the inner segment of the 5th leg:

Laophonte barbata Lang.
L. brevifurca Sars.
L. brevirostris (Claus) (= *L. herdmani* A. Scott).
L. capillata Wilson.
L. elongata var. *triarticulata* (Monard).
L. macani sp. nov.
L. recticauda Willey.
L. thoracica Boeck.
L. zimmeri van Douwe.

? *L. denticornis* T. Scott.

The position of *L. denticornis* is not certain, since T. Scott, 1894) shows the exopod of the 1st leg as possessing three segments, whereas Sars (1903–11) figures it with only two. It is also possible that *L. elongata* var. *triarticulata* Monard and *L. barbata* Lang are synonymous.

C. Species with 5 setæ on the outer and 3 on the inner segment of the 5th leg:

Laophonte simulans T. Scott.

D. Species with 4 setæ on both the outer and inner segments of the 5th leg:

Laophonte nordgaardi Sars.

E. Species with 3 setæ on both the outer and inner segments of the 5th leg:

Laophonte kliei Monard.

(iv) Species with 4 segments in the 1st antenna:

A. Species with 5 setæ on the outer and 2 (?) on the inner segment of the 5th leg:

Laophonte australasica Thomson.

Group II.—The exopod of the 1st leg is composed of two segments.
In this group the number of segments in the 1st antenna ranges from four to seven.

(i) Species with 7 segments in the 1st antenna :

A. Species with 7 setæ on the outer and 5 on the inner segment of the 5th leg :

Laophonte phycobatis Monard.

B. Species with 6 setæ on the outer and 5 on the inner segment of the 5th leg :

Laophonte curvata van Douwe.
L. pygmæa T. Scott.
L. trilobata Willey.

C. Species with 6 setæ on the outer and 4 on the inner segment of the 5th leg :

Laophonte exigua T. Scott.

D. Species with 5 setæ on the outer and 4 on the inner segment of the 5th leg :

Laophonte hyperborea Sars.
L. lunata Willey.
L. macera Sars.
L. perplexa T. Scott.
L. tenera Sars.

E. Species with 5 setæ on the outer and 3 on the inner segment of the 5th leg :

Laophonte longipes T. Scott.

F. Species with 4 setæ on both the outer and inner segments of the 5th leg :

Laophonte karmenensis Sars.

(ii) Species with 6 segments in the 1st antenna :

A. Species with 6 (or 7) setæ on the outer and 5 on the inner segment of the 5th leg :

Laophonte brevicornis T. Scott.
L. quinquespinosa Sewell.
L. sigmoides Willey.

In examples of *L. quinquespinosa* from the Chilka Lake I detected only six setæ on the exopod of the 5th leg, but Gurney states that in specimens from the Suez Canal there were seven.

B. Species with 6 setæ on the outer and 4 on the inner segment of the 5th leg :

Laophonte bulbifera Norman.
L. bulligera Farran.

C. Species with 6 setæ on the outer and 3 on the inner segment of the 5th leg :

Laophonte hirsuta Thompson and A. Scott.

D. Species with 5 setæ on the outer and 4 on the inner segment of the 5th leg :

Laophonte denticornis T. Scott.
L. elongata Boeck.
L. inopinata T. Scott.
L. nana Sars.
L. similis (Claus).

As mentioned above, in *L. denticornis* T. Scott (1894) gives the exopod of the 1st leg as possessing three segments ; Sars (1903–11), however, shows only two. If T. Scott is correct then this species will fit into Group I, (iii), B.

E. Species with 5 setæ on the outer and 4 setæ and 1 spine on the inner segment of the 5th leg :

Laophonte lithophila Monard.

F. Species with 5 setæ on the outer and 3 on the inner segment of the 5th leg :

Laophonte rosei Monard.

G. Species with 4 setæ on the outer and 3 on the inner segment of the 5th leg :

Laophonte longistylata Willey.

H. Species with 3 setæ on the outer and 5 on the inner segment of the 5th leg :

? *Laophonte mirabilis* Gurney.*

Gurney states that there are five segments in the 1st antenna, but he shows six in his figure (1927*c*, fig. 162, G).

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* Gurney (1927, p. 559) states: "Leg I . . . exopod minute, apparently one-jointed, but with very slight indication of the separation of a very minute basal joint".

I. Species with 3 setæ on the outer and 4 on the inner segment of the 5th leg :

Laophonte brevispinosa Sars.
L. horrida Norman.
L. hystrix Brian (=*L. armiger* Gurney).
L. steueri van Douwe.

J. Species with 3 setæ (spine-like) on both outer and inner segments of the 5th leg :

Laophonte talipes Wilson.

(iii) Species with 5 segments in the 1st antenna :

A. Species with 5 setæ on the outer and 4 on the inner segment of the 5th leg :

Laophonte intermedia T. Scott.

B. Species with 3 setæ on the outer and 3 or 4 on the inner segment of the 5th leg :

Laophonte mohammed Blanchard and Richard.

C. Species with 3 setæ on the outer and 3 setæ, or 2 setæ and a spinous projection, on the inner segment of the 5th leg :

Laophonte bengalensis Sewell.
L. chathamensis Sars.

(iv) Species with 4 segments in the 1st antenna :

A. Species with 6 setæ on the outer and 5 on the inner segment of the 5th leg :

Laophonte adduensis sp. nov.
L. cornuta Phil. (=*serrata* of Scott and Brady (*non* Claus)).

Willey (1931, p. 109, figs. 68–73) has described from Bermuda under the name *Laophonte echinata* a form in which the 1st antenna is composed of only four segments and the exopod of the 1st leg possesses two segments ; at first sight it would seem that this species might be included in the above group with *L. cornuta* Phil., but the complete absence of any endopod in the 2nd–4th swimming-legs and the character of the 5th leg, in which the free outer segment is not separated off from the basal inner segment and the inner prominence is represented merely by a small swelling bearing two setæ, suggest that a new genus should be created for it.

Group III.—The exopod of the 1st leg is composed of a single segment only.

(i) Species in which the 1st antenna is composed of 6 segments :

A. Species with 3 setæ on the outer and 5 on the inner segment of the 5th leg :

Laophonte mirabilis Gurney.

B. Species with 3 setæ on the outer and 4 on the inner segment of the 5th leg :

Laophonte trispinosa sp. nov.

Laophonte cornuta Philippi.

Laophonte cornuta, Philippi, 1840, p. 189, pl. iii, fig. 13 ; Sars, 1903–11, p. 235, pls. clvii, clviii ; Monard, 1928*a*, p. 415, fig. xxxix, 1.
Laophonte serrata, Brady, 1880, ii, p. 71, pl. lxxiii, figs. 1–14 ; T. Scott, 1894, p. 96, pl. xii, figs. 24–28.

OCCURRENCE.—Addu Atoll, Maldive Archipelago, in weed-washings ; two females.

DESCRIPTIVE NOTES.—♀. Total length, 0·80 mm. There is little or no division between the anterior and posterior regions of the body, the two merging into one another. The proportional lengths of the two regions are as 51 to 49. The rostral prominence is depressed and bluntly pointed. The proportional lengths of the segments of the posterior region are as follows :

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
13	27	15	15	13	17 = 100

The genital segment (Abd. 1–2) and segment 3 are expanded laterally, and all the thoracic and abdominal segments are ornamented along their posterior margins with a row of small, hemispherical knobs.

The various appendages agree closely with the descriptions and figures given by Sars (1903–11) and Monard (1928*a*).

DISTRIBUTION.—This species is very widely distributed. It has been recorded from the S.W. Pacific Ocean, New Zealand (Brady), Campbell Island (Lang), the Malay Archipelago (A. Scott), the Ceylon Pearl Banks (Thompson and A. Scott), the southern Indian Ocean, St. Paul and Kerguelen Islands (Brady), the Suez Canal (Gurney), the Mediterranean Sea (Philippi, Claus, Monard, Brian), the Cape of Good Hope (Brady), the Gulf of Guinea (T. Scott), Madeira (Fischer), the coast of North America, Wood's Hole (Wilson), Bermuda (Willey), the coast of Ireland (Farran), the coasts of the British Isles (Brady), and the coast of Norway (Sars). It is possible that the species described by Thomson from New Zealand under the name of *L. australasica* is also this species, for he admits that it may be *Cleta forcipata* Claus, which is a synonym of *L. cornuta*.

Laophonte adduensis sp. nov. (Text-fig. 71, A–J.)

OCCURRENCE.—Addu Atoll, Maldive Archipelago, in weed-washings ; two females.

DESCRIPTIVE NOTES.—♀. Total length, 0·96 mm.

There is little or no change in the width of the segments of the body (Text-fig. 71, A and B) as one passes from the anterior to the posterior region ; the proportional lengths of the two regions are as 53 to 47. Anteriorly the cephalosome terminates in a broad rostral process that from the dorsal aspect appears to be bluntly rounded. The proportional lengths of the segments of the posterior region are as follows :

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
10	28	16	15	12	19 = 100

The 5th thoracic segment and the first two abdominal segments are produced laterally in wing-like processes. The furcal rami are long and tapering and the 2nd furcal seta is much larger than the rest, and appears to continue the line of the furcal rami without any appreciable reduction in size.

The 1st antenna (Text-fig. 71, C) is composed of only four segments, that have the following proportional lengths :

Segment 1.	2.	3.	4.
25	29	29	17 = 100

There is a rounded knob-like process on the posterior margin of the 1st segment near the distal end. The 3rd segment bears a long sensory filament.

In the 2nd antenna (Text-fig. 71, D) the distal segment bears four spines, of which the distal two are markedly enlarged and are claw-like in character. The exopod is greatly reduced and bears four unequal setæ, the two that arise from the distal end being much the larger and the other two being obsolescent.

The mouth-parts (Text-fig. 71, E and F) closely resemble those of *L. cornuta*.

In the 1st leg (Text-fig. 71, G) the exopod consists of only two segments, and reaches to less than half the length of the 1st segment of the endopod. The latter ramus terminates in a stout claw.

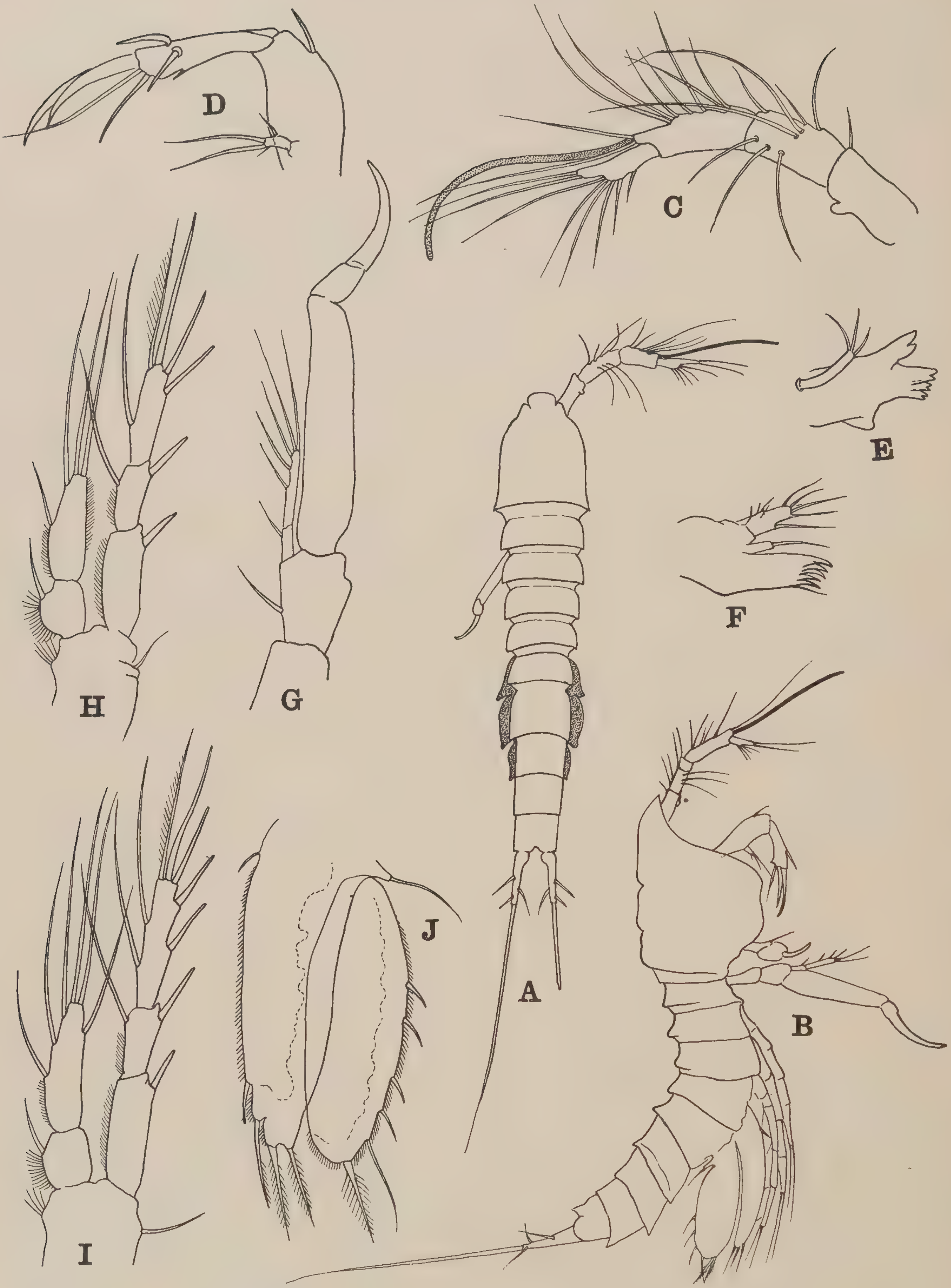
The 2nd–4th legs (Text-fig. 71, H and I) resemble those of *L. cornuta*. The setal formula for these limbs is as follows :

	Endopod.		Exopod.		
	1.	2.	1.	2.	3.
P2	1	2, 2, 0	0	1	1, 2, 2
P3	1	3, 2, 1	0	1	2, 2, 3
P4	1	2, 2, 1	0	1	2, 2, 3

In *L. cornuta* there are three marginal spines on the terminal segment of the exopod of the 2nd leg.

The 5th legs (Text-fig. 71, J) are large and foliaceous. The proximal inner segment is produced in a plate that reaches as far as the distal extremity of the free segment ; it bears two setæ at the distal end and three on the inner margin ; the whole of the inner margin is fringed with fine hairs. The distal free segment is an elongate oval, being nearly three times as long as wide ; at the distal end arises a single stout seta, and five setæ arise at approximately equal distances along the outer margin ; of these the distal is the longer and the other four are subequal. The distal and outer margins are fringed with short hairs.

Distribution.—At present known only from the Maldive Archipelago.



Text-fig. 71.—*Laophonte adduensis* sp. nov. a, Female, dorsal view. b, Female, lateral view. c, 1st antenna. d, 2nd antenna. e, Mandible. f, 1st maxilla. g, 1st leg. h, 2nd leg. i, 3rd leg. j, 5th leg.

This species is closely related to *L. cornuta* Phil., and (i) the possession of enlarged foliaceous plates in the 5th leg, (ii) the presence of only four segments in the 1st antenna, and (iii) the possession of only two segments in the exopod of the 1st leg, separate off these two species from all the other members of the genus.

Laophonte strömi (Baird).

Canthocamptus stromii, Baird, 1850, p. 208, pl. xxvii, figs. 3, 3*a*.
Laophonte strömi, Sars, 1903–11, p. 251, pls. clxxi, clxxii; Wilson, 1932, p. 273, fig. 169.
Laophonte strömi var. *brevicaudata*, Monard, 1928*a*, p. 426, fig. xliii, 2.

Occurrence.—Addu Atoll, Maldive Archipelago, in weed-washings; several examples, all females.

Descriptive Notes.—♀. Total length, 0·55 mm. This is very much smaller than the dimensions given by Sars for Norwegian examples, 0·88 mm., or by Wilson for examples from the Wood's Hole area, 0·8–0·9 mm. Specimens from the Mediterranean Sea examined by Monard were intermediate, having a length of 0·71–0·9 mm., while the variety, *brevicaudata*, from this region measured only 0·64 mm. There would thus seem to be a progressive decrease in size as one passes from the cold northerly habitat to the warm tropical one.

Distribution.—The Maldive Archipelago (present record), the Mediterranean Sea (Monard), the Adriatic (Pesta, Grandori), the east coast of North America, Wood's Hole (Wilson), the coast of Ireland (Farran), the British coasts (Baird, Brady), the Brittany coast, Roscoff (Monard), S.E. Greenland (Jespersen), the coast of Norway (Sars) and Franz-Josef Land (T. Scott).

Laophonte brevirostris (Claus). (Text-fig. 72, A–H.)

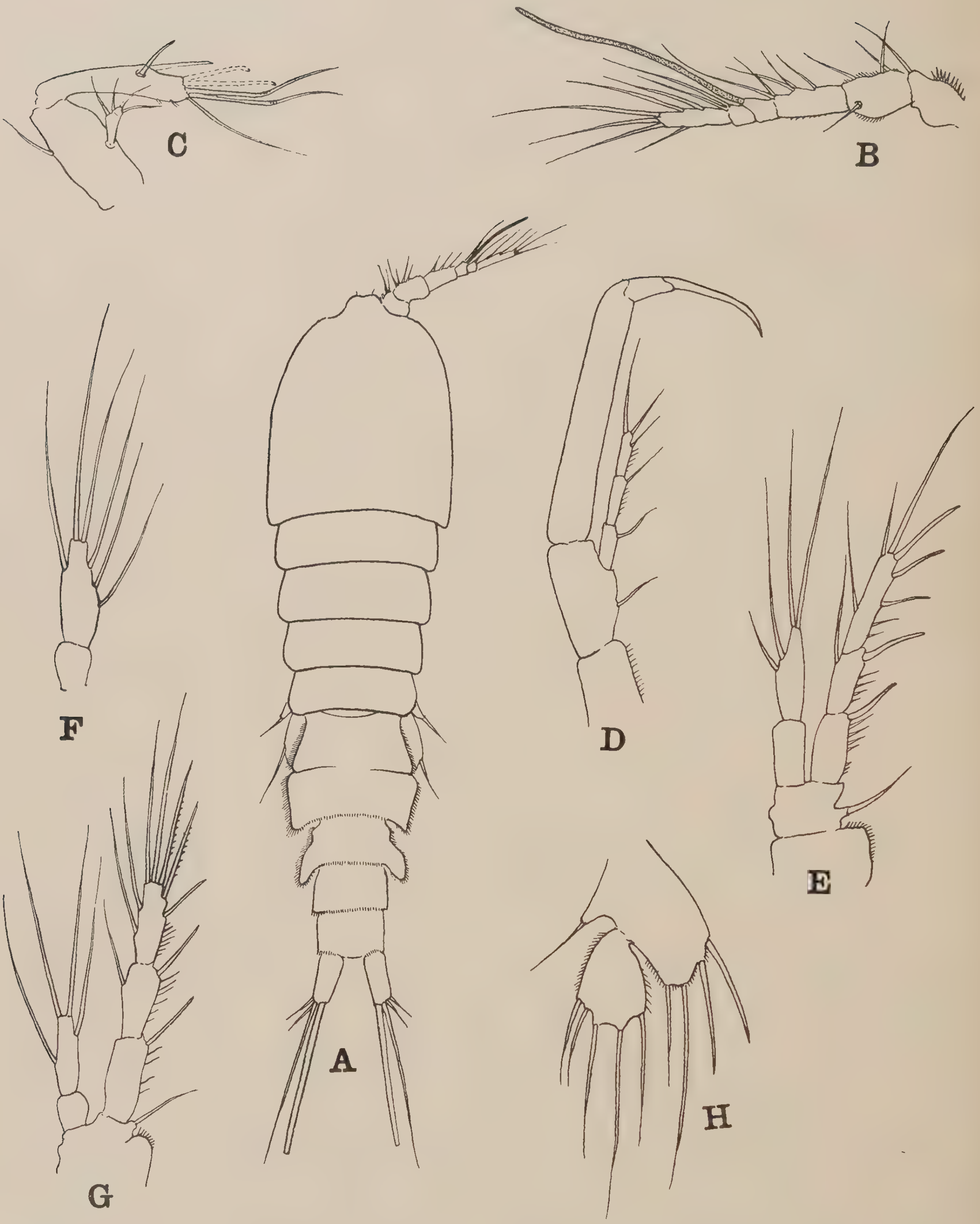
Cleta brevirostris, Claus, 1863, p. 124.
Laophonte herdmani, A. Scott, 1902, p. 414, pl. i, fig. 15; pl. ii, figs. 3–8; Norman and T. Scott, 1906, p. 159, pl. xi, figs. 5–7; pl. xii, fig. 6; pl. xiii, fig. 7; pl. xiv, fig. 8; pl. xvii, fig. 6.
Laophonte brevirostris, Sars, 1903–11, p. 256, pl. clxxvi; Gurney, 1927*c*, p. 553; Monard, 1928*a*, p. 424, fig. xlii, 3.

Occurrence.—" Investigator " Station 660, Ritchie's Archipelago, Andaman Islands, in weed-washings; a single female.

Descriptive Notes.—♀. Total length, 0·78 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 72, A) are as 49 to 51. The cephalosome is large, and equals in length the three following segments together. The genital segment of the abdomen is expanded laterally, and the line of fusion of segments 1 and 2 is clearly marked; the lateral aspects of the combined segment are fringed with fine spinules. The 3rd (2nd free) segment of the abdomen is also expanded laterally and is produced somewhat at the postero-lateral angles; the lateral aspects are fringed with small spines. The posterior margins of the 2nd, 3rd and 4th segments are fringed with spinules, and a row of similar spinules runs along the articulation of the anal segment with the furcal rami. The furcal rami are about twice as long as broad; this appears to be rather longer than in the examples examined by Sars.

The 1st antenna (Text-fig. 72, B) is composed of only six segments; the proximal three segments are long, the 4th and 5th quite short and the 6th long. In the present specimens



Text-fig. 72.—*Laophonte brevirostris* (Claus). A, Female, dorsal view. B, 1st antenna. C, 2nd antenna. D, 1st leg. E, 2nd leg. F, Endopod, 3rd leg. G, 4th leg. H, 5th leg.

the 2nd segment, instead of being produced on the posterior margin in a small spinous process, was simply rounded, the prominence being covered with minute spinules.

In the 2nd antenna (Text-fig. 72, c) the exopod is small and bears four setæ.

In the 1st leg (Text-fig. 72, D) the exopod is composed of three segments, of approximately equal length, and the ramus reaches nearly half-way along the proximal segment of the endopod. The endopod is well developed and the terminal claw is long and comparatively slender.

The setal formula of the 2nd–4th legs (Text-fig. 72, E, F and G) is as follows :

	Endopod.		Exopod.		
	1.	2.	1.	2.	3.
P2	0	2, 2, 0	0	1	1, 2, 3
P3	0	3, 2, 1	0	1	2, 2, 3
P4	0	1, 2, 1	0	1	2, 2, 3

In the 5th leg (Text-fig. 72, H) the proximal segment is broad, and reaches to about two-thirds the length of the distal segment ; it bears four setæ, of which the 2nd, counting from the inner side, is considerably longer than the others, which are subequal ; the inner two are spine-like in character. The distal segment is comparatively short and broad ; it bears on the sloping outer distal border three subequal setæ ; a fourth long seta arises from the tip of the segment and one from the inner border. Both margins of the outer segment are fringed with hairs, and of the inner with short spinules.

Distribution.—The Andaman Islands (present record), the Red Sea (A. Scott), the Suez Canal (Gurney), the Mediterranean Sea (Claus), the British Isles (T. Scott, Norman and T. Scott) and the coast of Norway (Sars).

Laophonte macani sp. nov. (Text-fig. 73, A–F.)

Occurrence.—Sta. 45, South Arabian Coast, depth 40 m. ; a single female.

Descriptive Notes.—♀. Total length, 0·5 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 73, A) are as follows :

Anterior region including the rostrum	47
Posterior region	53

The rostrum is prominent and in its general form closely resembles that of *L. brevispinosa* Sars, the antero-lateral corners being emarginate, and from each indentation arises a very small sensory hair. The cephalosome is roughly quadrangular in shape and presents a granular appearance. The 2nd–4th thoracic segments are approximately equal in size, and each is produced in a well-developed ridge that runs transversely across the dorsal aspect. The posterior margin of the cephalosome and the dorsal ridge of the first three free thoracic segments are ornamented with rows of minute granules ; the dorsal ridge of the 5th thoracic segment is armed with a row of fine spinules. In the posterior region the genital segment and the next free segment (Abd. 3) are produced at their postero-lateral angles in rounded prominences that are fringed with needle-like spines. All the abdominal segments are fringed along their posterior margins with a row of fine spinules. The furcal rami are nearly twice as long as broad, and the inner furcal seta is long and strong, being about equal in length to the last three segments and the furcal rami. The proportional lengths of the segments of the posterior region are as follows :

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
13	29	16	16	13	13 = 100

The 1st antenna consists of six segments, that have the following proportional lengths :

Segment 1.	2.	3.	4.	5.	6.
25	25	21	6	6	17 = 100

The 3rd segment exhibits a difference on the two sides of the body ; on the left side this segment appears to be divided into two, a long basal part and a small distal portion, which at first sight appears to be the 4th segment, followed by three other small segments, but as the long sensory seta arises, not from this distal part but from the next segment, it is clear that this is merely an abnormal subdivision of the 3rd segment.

The 2nd antenna (Text-fig. 73, B) has the usual form ; it consists of two segments, of which the distal bears two spines and four geniculate setæ. The endopod is small. and consists of a single segment bearing four setæ.

The maxilliped (Text-fig. 73, C) is comparatively slender.

The 1st swimming-leg (Text-fig. 73, D) consists of a three-jointed exopod, in which the 1st and 2nd segments bear only a slender external marginal spine and no inner seta ; the terminal segment bears two marginal spines, an end-spine and a single seta at the distal angle. The endopod consists of two segments, the proximal being extremely long, about twice the length of the whole exopod ; the distal segment bears a curved, claw-like spine.

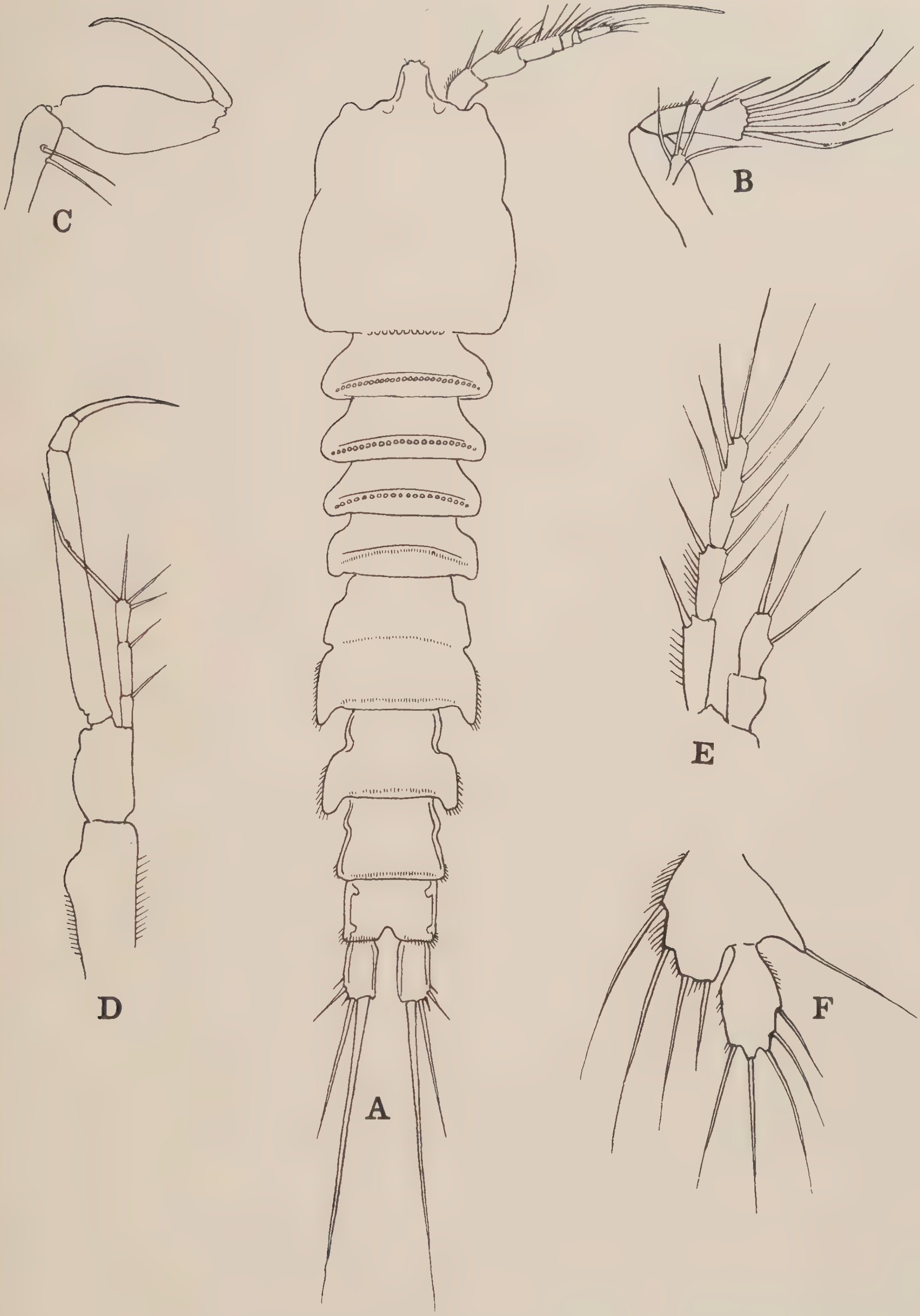
The 2nd and 3rd legs each appear, so far as I could make out without dissecting the specimen, to consist of three-jointed exopod and two-jointed endopod. In the 4th leg (Text-fig. 73, E) the endopod is composed of two segments, of which the distal bears three setæ. The spines of the exopods of the swimming-legs are very long and slender.

In the 5th leg (Text-fig. 73, F) the proximal segment is expanded and is produced somewhat distally, but this prolongation is comparatively short, and only reaches as far as the junction of the proximal and middle thirds of the free segment. The free segment is oval in shape and bears five setæ. The margins of both segments are fringed with hairs.

The characters of this species place it definitely in the same group as—

Laophonte barbata Lang,
L. brevirostris (Claus) (=*L. herdmani* A. Scott),
L. capillata Wilson,
L. elongata var. *triarticulata* Monard,
L. recticaudata Willey,
L. thoracica Boeck,
L. zimmeri van Douwe,
and perhaps
L. denticornis T. Scott.

Of these it appears to come nearest to *barbata* Lang and *elongata* var. *triarticulata* Monard, but the exopod of the 5th leg is not nearly so elongate ; it is also near to *thoracica* Boeck, but the furcal rami are much shorter and the rostrum has a different shape, while there



TEXT-FIG. 73.—*Laophonte macani* sp. nov. A, Female, dorsal view. B, 2nd antenna. C, Maxilliped. D, 1st leg. E, 4th leg. F, 5th leg.

are three setæ on segment 2 of the endopod of the 4th leg instead of only two, thus resembling *brevirostris* (Claus). It is separated from this last species by the shape of the 5th leg. This latter character also separates it from the other species in the group.

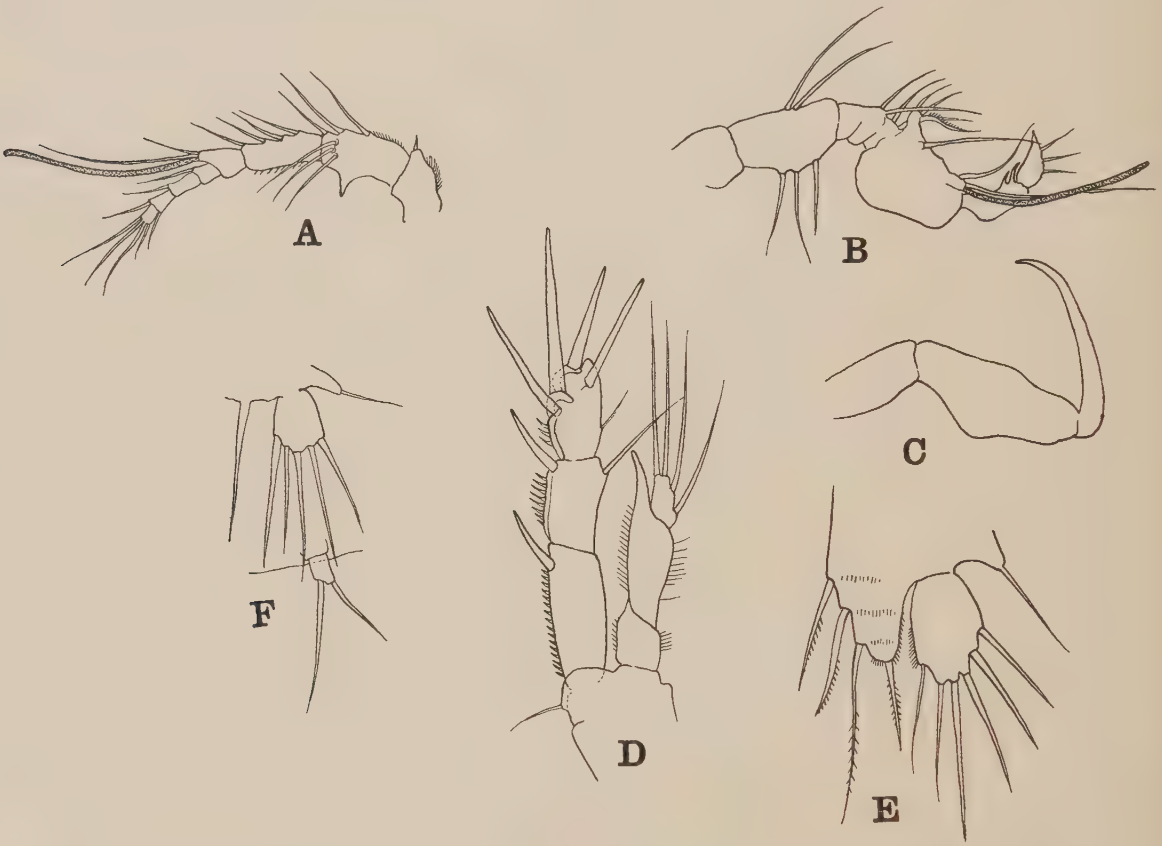
I have much pleasure in dedicating this species to Mr. T. T. Macan, who was one of my colleagues on the expedition, and to whose care in sorting out material, the preservation of this specimen was due.

Distribution.—At present known only from the Arabian Coast, Indian Ocean.

Laophonte gurneyi Lang. (Text-fig. 74, A–F.)

Laophonte meinerti, Gurney, 1927*c*, p. 556, fig. 160, A–E (*non* Brady).
Laophonte gurneyi, Lang, 1934, p. 40.

Occurrence.—Nankauri Harbour, Nicobar Islands, in weed-washings; one female and one male.



Text-fig. 74.—*Laophonte gurneyi* Lang. A, 1st antenna, female. B, 1st antenna, male. C, Maxilliped, male. D, 3rd leg, male. E, 5th leg, female. F, 5th leg and genital armature, male.

Descriptive Notes.—As Lang (*loc. cit.*) has pointed out, the form described by Gurney from the Suez Canal under the name *Laophonte meinerti* Brady is not in reality an example of that species, differing from it in the female in the number of segments of the 1st antenna (eight instead of seven), and the number of setæ on the distal segment of the 5th foot (six instead of five); and in the male in the very different shape of the distal segment of the 5th foot.

The present examples agree clearly with those described by Gurney.

In the male (Text-fig. 74, B) the 1st antenna differs slightly from the account and figure given by Brady of the appendage in *L. meinerti*; while forming a somewhat similar grasping organ, the 2nd segment did not, so far as I could discover, possess any spinous process, the swollen part of the claw was produced proximally in a rounded process, from which a serrated seta arose, and the long sensory filament had its origin more distally than in Brady's species; finally the distal portion of the claw appeared to consist of two segments only, whereas Brady figures three.

The 3rd swimming-leg (Text-fig. 74, D) is modified, and in its general structure closely resembles Gurney's examples. The 1st segment of the exopod is long and bears no inner marginal seta; the 2nd segment bears an outer spine and an inner seta; the 3rd segment is furnished with four spines on the outer and distal margin, and in the present specimen a single diminutive seta arose from the inner border, Gurney figures two small setæ in this situation. In Lang's examples of *L. meinerti* Brady there are four spines on the outer and distal margins, and the inner setæ are modified into two well-developed spines.

In the 5th leg (Text-fig. 74, F) the distal segment is small and is nearly as broad as long; it bears five setæ. Lang's examples of *L. meinerti* have the free segment much more elongate.

DISTRIBUTION.—The Nicobar Islands (present record) and the Suez Canal (Gurney).

Laophonte meinerti Brady. (Text-fig. 75, A–J.)

Laophonte meinerti, Brady, 1899, p. 40, pl. xi, figs. 1–10; Lang, 1934, p. 37, figs. 91–101.

OCCURRENCE.—Nankauri Harbour, Nicobar Islands, in weed-washings. Addu Atoll, Maldive Archipelago, in weed-washings.

DESCRIPTIVE NOTES.—♀. Total length, 0·64 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 75, A) are as 53 to 47. The cephalosome is longer than the three following segments together. The rostrum is not very prominent; it ends in a bilobed rounded extremity, on each side of which arises a minute seta. The proportional lengths of the segments of the posterior region are as follows:

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
14	30	16	12	12	16 = 100

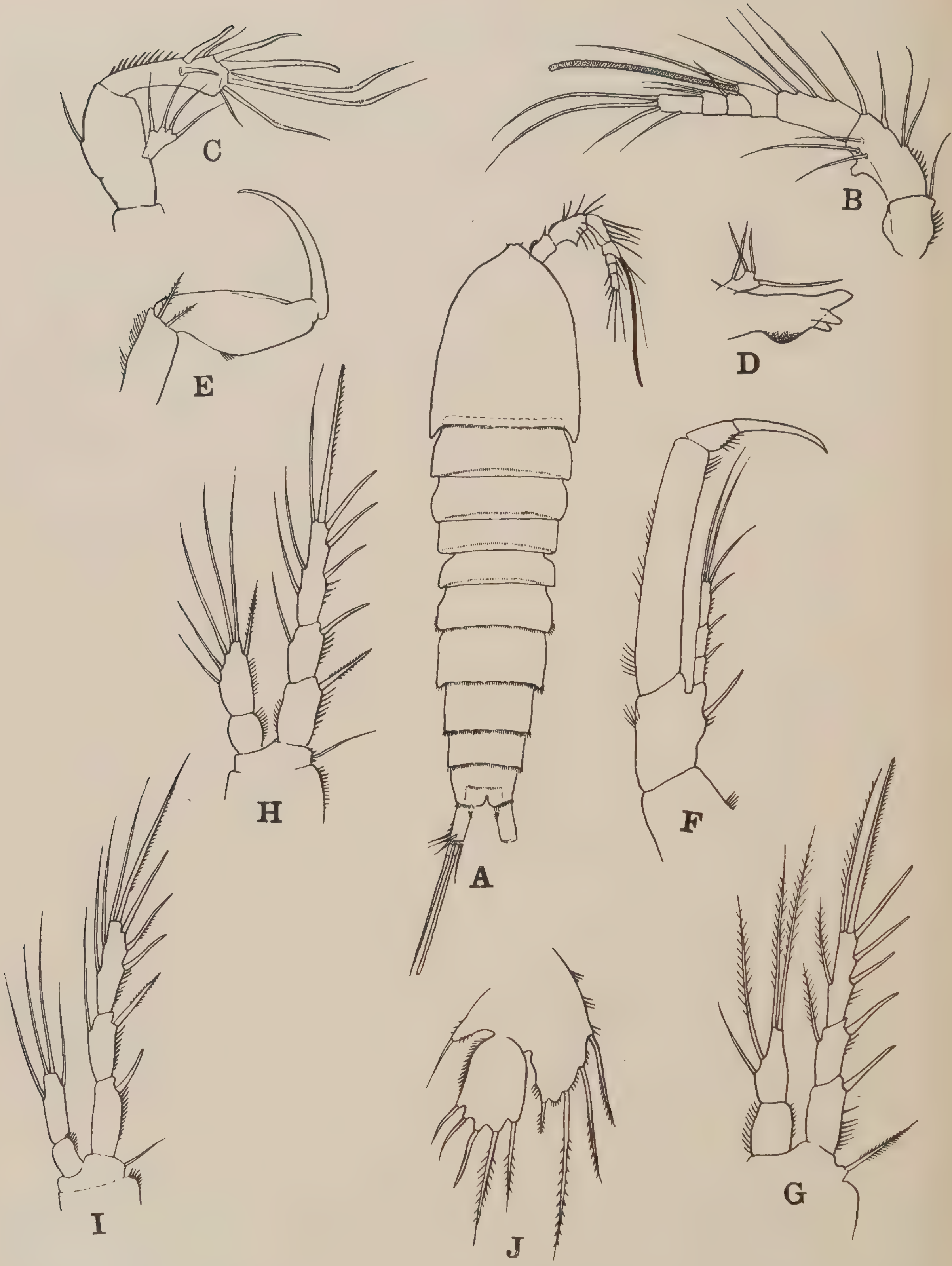
All the segments of the body appear to be fringed with a row of minute spinules along the posterior margin, and on the 5th segment a row of spines runs along the posterior margin of the anal operculum. The furcal rami are rather more than twice as long as broad.

The 1st antenna (Text-fig. 75, B) consists of seven segments that have the following proportional lengths:

Segment 1.	2.	3.	4.	5.	6.	7.
19	26	22	7	6	8	12 = 100

The proximal segment bears a row of spinules along its anterior margin; the 2nd segment is produced about the junction of the middle and distal thirds of its posterior border in a blunt or pointed, slightly curved process, and the proximal half of the anterior margin is ornamented with a row of small spinules.

In the 2nd antenna (Text-fig. 75, C) the exopod consists of a small but rather broad



TEXT-FIG. 75.—*Laophonte meinerti* Brady. A, Female, dorsal view. B, 1st antenna. C, 2nd antenna. D, Mandible. E, Maxilliped. F, 1st leg. G, 2nd leg. H, 3rd leg. I, 4th leg. J, 5th leg.

segment bearing four setæ. The distal segment of the endopod bears four spines, the proximal one arising from the face of the segment and not from the anterior margin; there are three geniculate setæ and one straight seta on the distal border.

The mandible (Text-fig. 75, D) is produced in three strong teeth on the biting edge; the palp is small and bears four setæ.

In the 1st leg (Text-fig. 75, F) the exopod is delicate, and reaches to about half the length of the proximal segment of the endopod; it is composed of three segments, the distal being the longest.

The setal formula of the 2nd to 4th legs (Text-fig. 75, G, H and I) is as follows:

	Endopod.		Exopod.		
	1.	2.	1.	2.	3.
P2	0	2, 2, 0	0	1	1, 2, 3
P3	0	3, 2, 1	0	1	2, 2, 3
P4	0	1, 2, 1	0	1	2, 2, 3

In the 5th leg (Text-fig. 75, J), the inner projection of the proximal segment is broad and bears four setæ, of which two arise from the inner margin and two from the broad distal end; the border of the lobe is fringed with small spinules. The distal segment is somewhat longer than broad and bears five setæ, of which the outer three are subequal. In the present specimen this segment is somewhat longer than is figured by Lang (1934, fig. 97), but agrees closely in other respects.

DISTRIBUTION.—The south-west region of the Pacific Ocean, New Zealand (Brady), Campbell Island (Lang); the Nicobar Islands and the Maldive Archipelago (present records).

Laophonte bulbifera Norman.

Laophonte bulbifera, Norman, 1911, p. 137, pl. xxviii; Gurney, 1927*c*, p. 553, fig. 157, A–C; Monard, 1928*a*, p. 418, fig. xl, 2.

OCCURRENCE.—Nankauri Harbour, Nicobar Islands, in weed-washings. Addu Atoll, Maldive Archipelago, in weed-washings.

DESCRIPTIVE NOTES.—♀. Total length, 0·62 mm. This is much smaller than the specimens taken by Norman in the Firth of Clyde or by Monard in the Mediterranean, both of which measured 0·8 mm.; the example examined by Gurney from the Suez Canal measured 0·68 mm.

The characters of the body and appendages agree closely with the descriptions given by Norman and Monard.

The 1st antenna consists of six segments having the following proportional lengths:

Segment	1.	2.	3.	4.	5.	6.
	18	27	27	7	3	18 = 100
(Monard) .	17	29	21	9	3	21 = 100

For convenience of reference I have also given the measurements according to Monard, recalculated as parts per 100.

The setal formula of the 2nd–4th legs is as follows:

	Endopod.		Exopod.		
	1.	2.	1.	2.	3.
P2	1	2, 2, 1	0	1	1, 2, 3
P3	1	3, 2, 1	0	1	2, 2, 3
P4	0	2, 2, 1	0	1	2, 2, 3

Monard, in his figure of the 5th leg, has omitted the 4th curved seta that arises near the base of the inner margin of the proximal segment; the present examples agree exactly with the figure given by Gurney.

Distribution.—Nicobar Islands and Maldive Archipelago (present records), the Suez Canal (Gurney), the Mediterranean Sea (Monard), the Firth of Clyde (Norman), the west coast of Ireland (Farran), and Bermuda (Willey).

Laophonte trispinosa sp. nov. (Text-fig. 76, a–f.)

Occurrence.—Addu Atoll, Maldive Archipelago, in weed-washings; a single specimen, female.

Descriptive Notes.—♀. Total length, 0·80 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 76, a) are as 60 to 40. In its shape and general proportions this species approaches near to *L. mirabilis* Gurney, but the absence of any spiny projections on the surface of the body-segments makes it resemble *L. armiger* Gurney (= *L. hystrix* Brian). The genital segment of the abdomen (Text-fig. 76, b) is expanded laterally, and the margins are fringed with needle-like spinules. The proportional lengths of the segments of the posterior region are as follows:

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
23	29	13	11	9	15 = 100

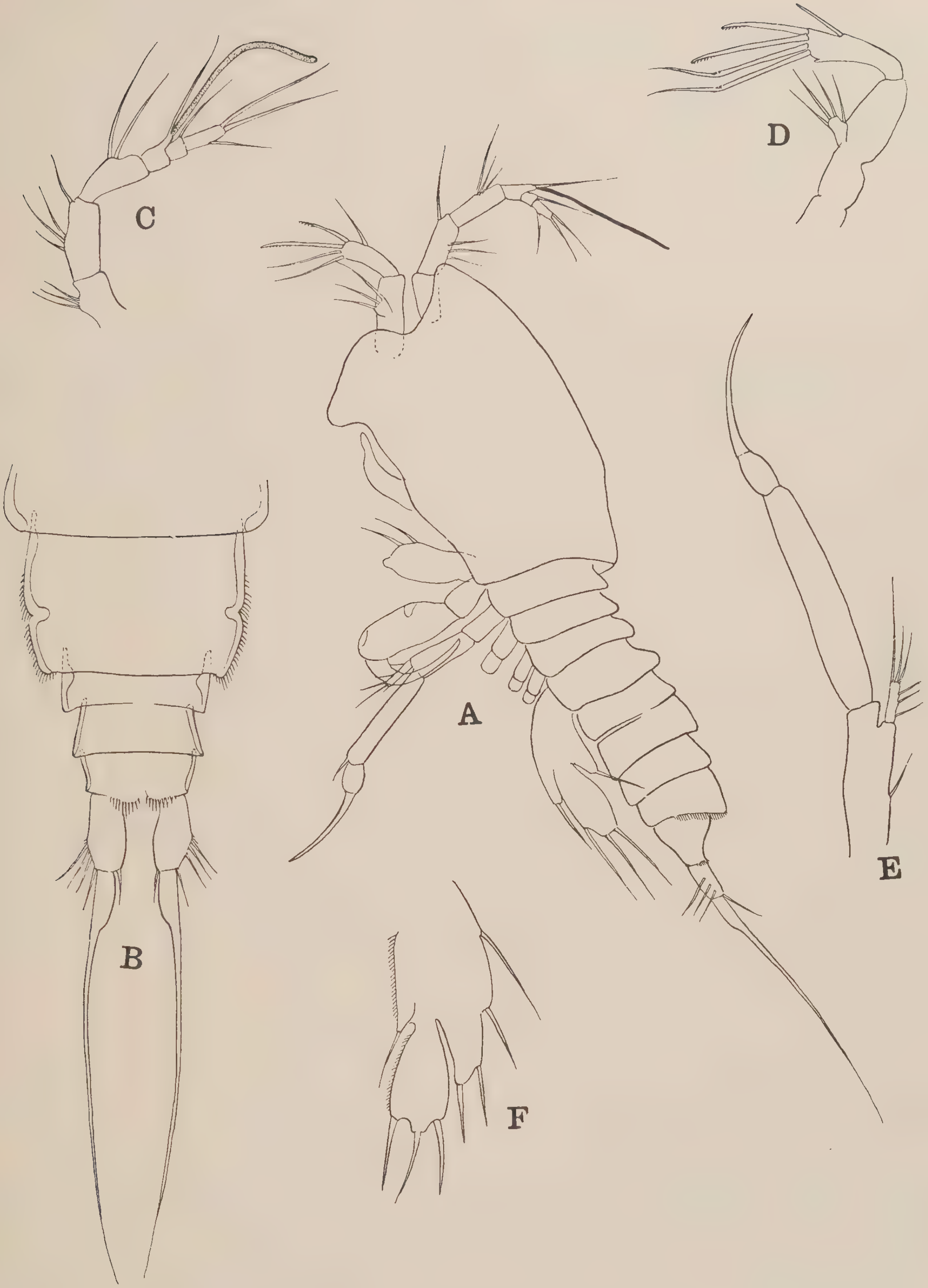
The furcal rami are twice as long as broad. The 2nd furcal seta is strongly dilated at the base.

The 1st antenna (Text-fig. 76, c) consists of six segments that have the following proportional lengths:

Segment 1.	2.	3.	4.	5.	6.
24	26	26	8	5	11 = 100

The 2nd antenna (Text-fig. 76, d) consists of three segments, the distal of which bears three spines and two geniculate setæ; of the spines, the 2nd and 3rd are fringed with a row of small spinules along their distal fourth. The exopod is reduced to a small, single segment, bearing four setæ.

In the 1st leg (Text-fig. 76, e) the exopod is reduced and, so far as I could make out, is composed of a single segment, that bears one seta on its outer margin near the base, two on the outer margin in the distal half and three distally. The presence of only a single segment in this ramus separates this species from *Laophonte horrida* Norman, *L. brevispinosa* Sars, *L. armiger* Gurney and *L. mirabilis* Gurney.



Text-fig. 76.—*Laophonte trispinosa* sp. nov. A, Female, lateral view. B, Abdomen, dorsal view. C, 1st antenna. D, 2nd antenna. E, 1st leg. F, 5th leg.

The 5th leg (Text-fig. 76, F) closely resembles that of *Laophonte horrida*, *L. brevispinosa* and *L. armiger*. The proximal segment is produced as far as the junction of the middle and distal thirds of the distal free segment, and it bears four spine-like setæ, three on the inner margin and one distally. The distal segment is pyriform in shape and is about twice as long as broad; it bears three setæ on the distal margin.

DISTRIBUTION.—Addu Atoll, Maldive Archipelago.

Family CEYLONIELLIDÆ.

Genus *Ceyloniella* Wilson (= *Jurinia* Claus; *Ceylonia* Thompson and A. Scott; *Lourinia* Wilson).

The genus *Jurinia* was created by Claus (1866) to accommodate a new species that he named *Jurinia armata*. Thompson and A. Scott (1903), in ignorance of Claus's paper, described what appears to have been the same species under the name *Ceylonia aculeata*, creating the genus *Ceylonia* for its accommodation. A. Scott (1909) admitted the identity of these two forms, but pointed out that Claus' genus *Jurinia* was invalid as the name was already preoccupied. Wilson (1925) pointed out that Thompson and A. Scott's name, *Ceylonia*, was also preoccupied, and he renamed this genus *Ceyloniella*; in the same paper he pointed out that the name *Jurinia* was preoccupied, and he renamed this genus *Lourinia*, under the impression that *Jurinia* and *Ceylonia* were different, though closely related, genera. The supposed difference between these two genera, according to the Key published by Wilson in 1932, is that in *Ceylonia* the proximal segment of the 2nd antenna is divided into two, and the exopod is attached to the end of the distal portion, whereas in *Jurinia* this segment is not divided. Claus (1866), in his definition of the genus *Jurinia*, states: " Die sehr gedrungene Antenne des zweiten paares trägt einen schmalen und rudimentären, nur mit 2 Borsten versehenen Nebenast "; in his figure (fig. 18) he does not show an actual separation of the basal joint into two segments, but there is a very distinct notch in the margin opposite the point of attachment of the exopod. I am in entire agreement with earlier writers who regard *Jurinia* and *Ceylonia* as synonyms. Gurney (1927) maintains that the name *Ceylonia* is valid; but this is, I think, incorrect. The name of the genus must be *Ceyloniella* Wilson, and in consequence the name of the family should be alterred to *Ceyloniellidæ*.

Ceyloniella armata (Claus).

Jurinia armata, Claus, 1866, p. 25, pl. ii, figs. 15–24.
Ceylonia aculeata, Thompson and A. Scott, 1903, p. 265, pl. vii, figs. 11–23.
Ceylonia armata, A. Scott, 1909, p. 228.
Laurinia armata, Wilson, 1924, p. 15.
Ceylonia armata, Gurney, 1927*c*, p. 567.
Ceylonia aculeata var. *adriatica*, Brian, 1928*a*, p. 23, figs. 100–104.
Ceylonia armata, Brian, 1928*b*, p. 330.
Ceyloniella armata, Willey, 1930, p. 111, figs. 76–78.

OCCURRENCE.—Nankauri Harbour, Nicobar Islands, in weed-washings; examples of both sexes. Addu Atoll, Maldive Archipelago, in weed-washings; examples of both sexes.

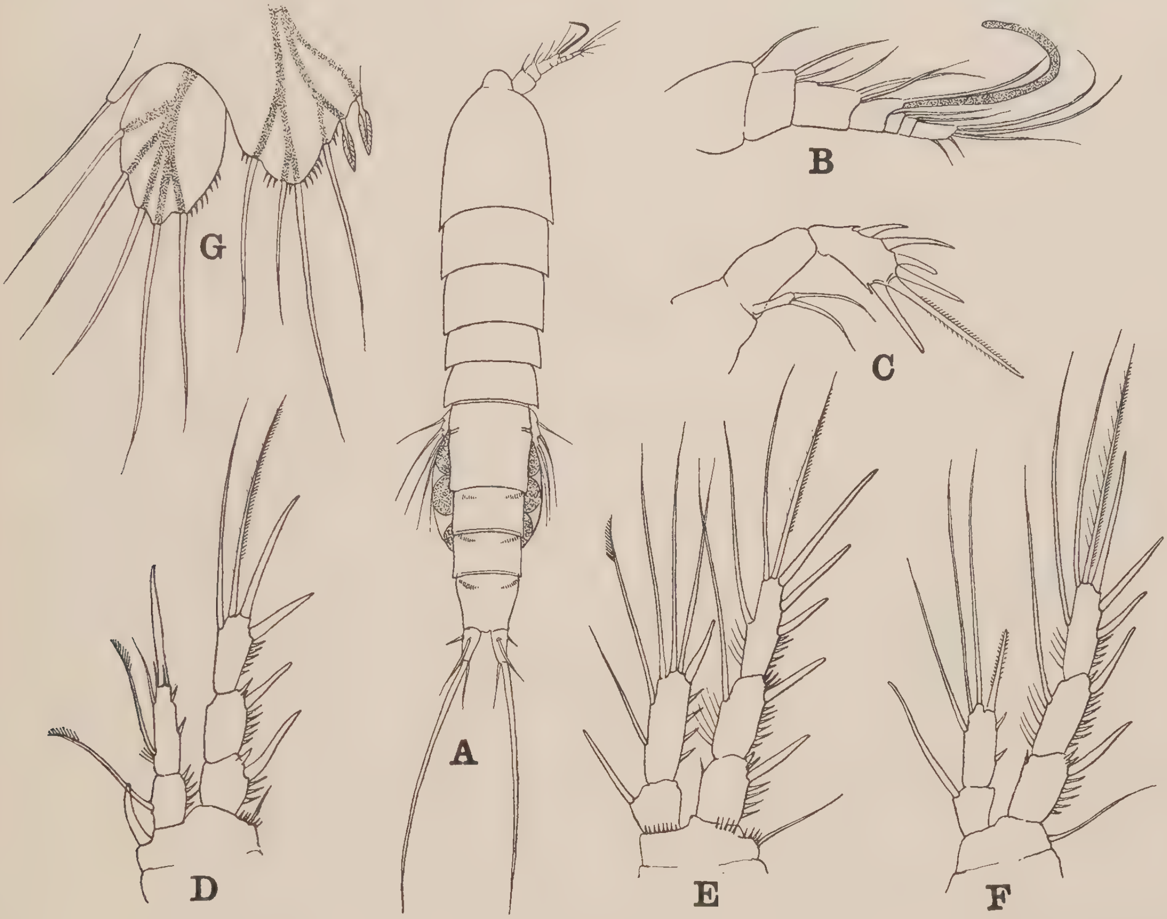
The examples of this species that I have examined clearly fall into two groups, distinguished from each other by size.

f. *major*. (Text fig. 77, A–G, ♀; Text-fig. 78, A–F, ♂.)

DESCRIPTIVE NOTES.—♀. Total length, 0·904–1·013 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 77, A) are somewhat variable, ranging from 48 to 52 to 53 to 47. The body is elongate and slender. The rostrum is deflexed and is rounded. The median eye is bright red in colour. The proportional lengths of the segments of the posterior region are as follows :

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
13	29	18	14	15	11 = 100



TEXT-FIG. 77.—*Ceyloniella armata* (Claus), f. *major*, ♀. A, Female, dorsal view. B, 1st antenna. C, 2nd antenna. D, 1st leg. E, 2nd leg. F, 4th leg. G, 5th leg.

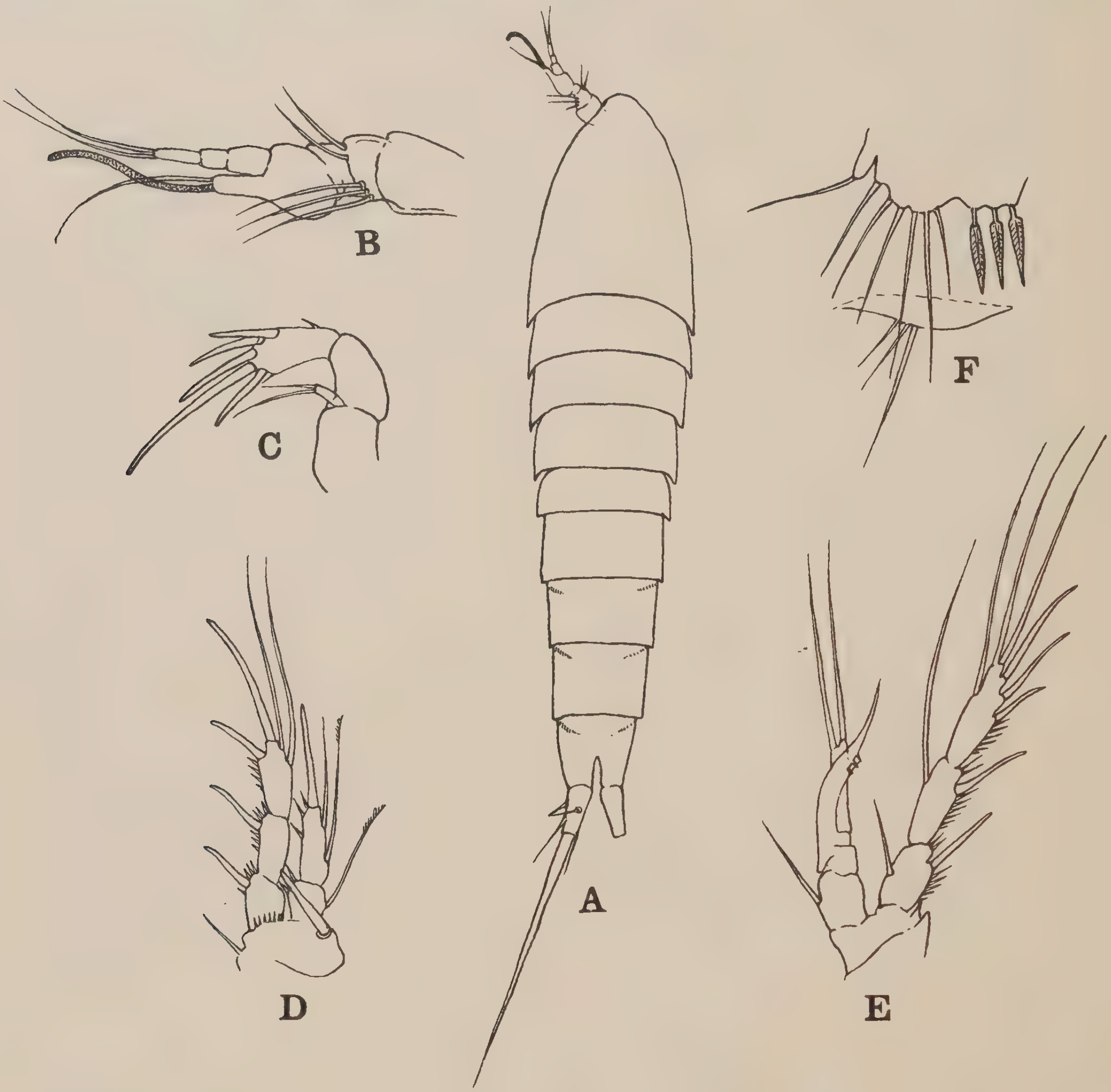
The genital segment shows a well-marked line of fusion of the two segments in the dorso-lateral region. The rest of the abdominal segments are ornamented with a row of fine spinules in the dorso-lateral area. The furcal rami are conical, and merge with the strong 2nd furcal seta in a gradual tapering form.

The 1st antenna (Text-fig. 77, B) possesses seven segments, that have the following proportional lengths :

Segment	1.	2.	3.	4.	5.	6.	7.
	29	13	16	11	5	7	19 = 100
(Thompson and Scott)	22	16	22	12	4	8	15 = 99

For the purpose of reference I have given above the proportional lengths as noted by Thompson and A. Scott, recalculated as parts per 100.

The 2nd antenna (Text-fig. 77, C), mouth-parts and swimming-feet agree closely with the descriptions given by Thompson and A. Scott (1903) and Brian (1928*a*).



TEXT-FIG. 78.—*Ceyloniella armata* (Claus), f. *major*, ♂. A, Male, dorsal view. B, 1st antenna. C, 2nd antenna. D, 1st leg. E, 3rd leg. F, 5th leg and genital armature.

In the 1st swimming leg (Text-fig. 77, D) the proximal segment of the endopod bears a modified seta that terminates in a comb; in the present examples a similar seta is carried by the distal segment on its inner border, thus agreeing with the description given by Willey of the specimens taken by him in Bermuda, but differing from the original examples from Ceylon (*vide* Thompson and A. Scott, 1903, pl. vii, fig. 18) and those from the Mediterranean Sea (*vide* Brian, 1928*a*, fig. 101).

The 5th leg (Text-fig. 77, G) differs slightly from previously described forms, for the distal segment is distinctly longer and narrower in shape; it bears five setæ, thus agreeing with the specimens described by Claus, Gurney, Brian and Willey, and differing from the description of Thompson and A. Scott, who figure six setæ arising from this segment. The proximal segment bears four setæ and two spear-shaped spines.

The sexually mature females were bearing a single egg-sac, in which the number of ova varied from 10 to 12.

♂. Accompanying these females were a few males, that agree closely in their general form with the females but are slightly smaller in size (Text-fig. 78, A).

The 1st antenna (Text-fig. 78, B) is modified to form a grasping organ.

The 3rd leg is modified (Text-fig. 78, E). The exopod is normal, but the endopod shows a characteristic change. There appear to be three segments in the endopod, of which the first is normal and bears a single seta; the 2nd segment is produced basally on its inner side into a stout S-shaped tapering process that extends far beyond the distal end of the 3rd segment, and bears on its outer margin about half-way along its length a series of three small curved hooks. The 3rd segment is cylindrical, and carries two setæ at its distal end.

In the 5th leg (Text-fig. 78, F) the distal segment is not differentiated; it forms a slight prominence bearing six setæ. The proximal or inner segment is also represented by a prominence that bears three spear-shaped spines.

f. *minor*. (Text-fig. 79, A–F.)

At "Investigator" Station 630, west side of Nankauri Island, Nicobar Islands, a few examples of what appears to be a small dimorph of this species were obtained.

♀. Total length, 0·691 mm.

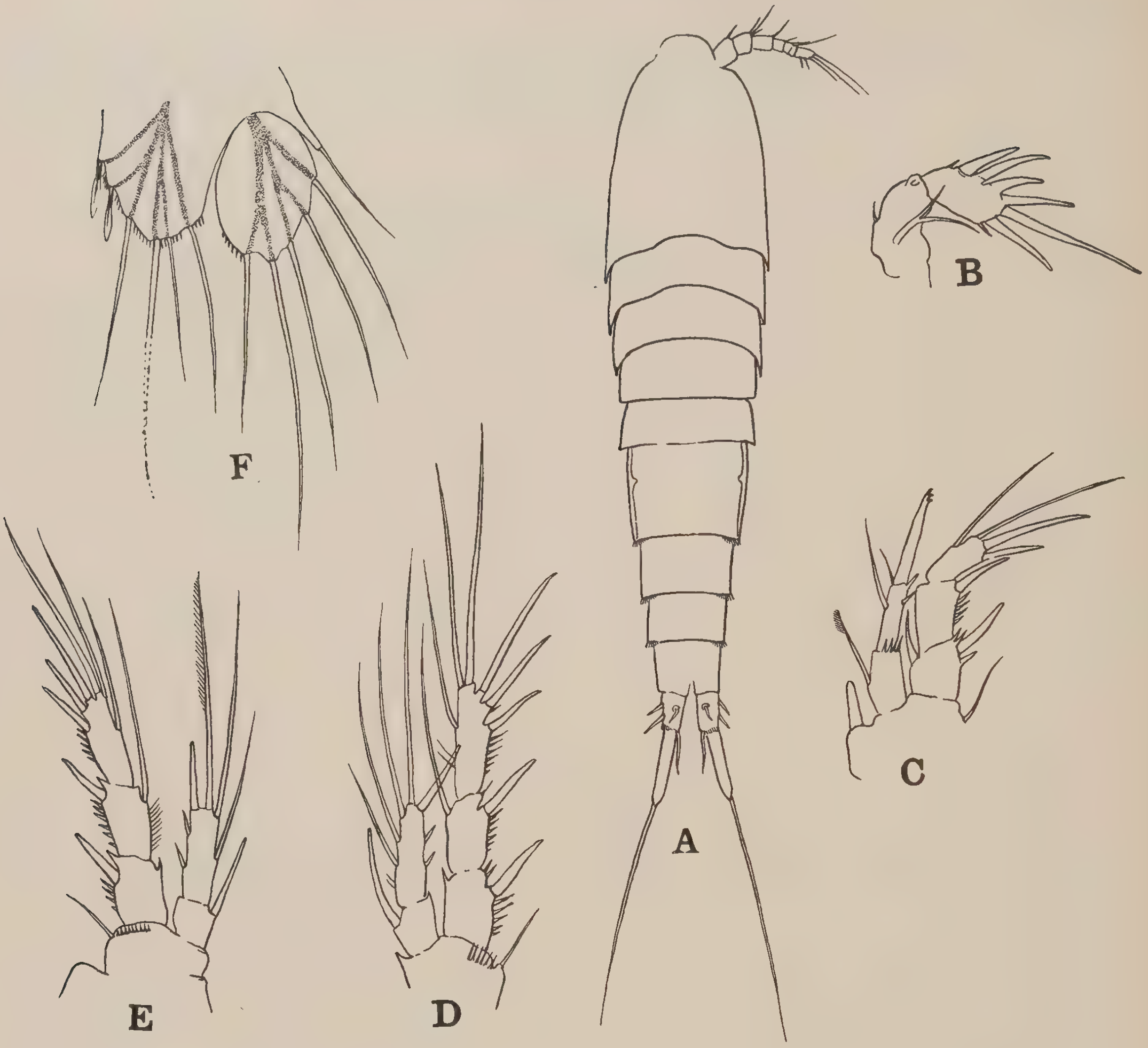
The proportional lengths of the anterior and posterior regions of the body (Text-fig. 79, A) are as 42 to 58; the posterior region thus appears to be considerably longer than in the typical form. The proportional lengths of the segments of the posterior region are as follows:

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
10	26	20	17	17	10 = 100

The segments of the abdomen are armed with rows of fine spinules, as in the typical form. In this variety the 2nd furcal seta is very markedly thickened in its basal part and for about one-fourth of its length; it then abruptly narrows and is continued as a normal seta.

In the 1st leg there are some slight differences in structure from f. *major*. The spine at the inner distal angle of the 2nd basal segment appears to be slightly shorter and is straight. Only the inner seta arising from the 1st segment of the endopod is provided with a comb. The terminal spine on the 2nd segment of the endopod is serrate at its extreme tip.

Distribution.—The Malay Archipelago (A. Scott), the Nicobar Islands (present record), the Ceylon Pearl Banks (Thompson and A. Scott), the Maldive Archipelago (present record), the Suez Canal (Gurney), the Mediterranean Sea (Claus, Brian, Monard) and Bermuda (Willey).



Text-fig. 79.—*Ceyloniella armata* (Claus), f. *minor*, ♀. A, Female, dorsal view. B, 2nd antenna. C, 1st leg. D, 3rd leg. E, 4th leg. F, 5th leg.

Ceyloniella nicobarica sp. nov. (Text-fig. 80, A–J.)

Occurrence.—"Investigator" Station 630, west side of Nankauri Island, in weed-washings; several examples of both sexes.

Descriptive Notes.—♀. Total length, 1·145 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 80, A) are as 47 to 53. The proportional lengths of the segments of the posterior region are as follows:

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
12	26	16	16	16	14 = 100

As in *Ceyloniella armata*, the posterior margins of the 2nd–4th abdominal segment are armed with a row of minute spinules, and so also are the margins of the articulations of the furcal rami on the 5th segment. In this form the 2nd furcal seta has a most characteristic shape, being paddle-shaped, or "spathulate"; the proximal half is broad and flat.

The 1st antenna (Text-fig. 80, B) consists of seven segments, but the distal segment shows distinct traces of a division into two; the proportional lengths are as follows:

Segment 1.	2.	3.	4.	5.	6.	7.
23	13	23	8	6	7	20 = 100

The chitin is thickened along the posterior aspect of segments 3 to 6 inclusive, and the proximal half of the 7th.

The 2nd antenna (Text-fig. 80, C) consists of three segments, of which the 2nd and 3rd are of approximately equal length; the exopod is short and bears two setæ; it is attached to the base of the 2nd segment.

The mandible (Text-fig. 80, D) is armed on its biting edge with stout rounded teeth, and the palp, which appears to be composed of a single ramus, bears two plumose setæ distally and three smooth setæ on its outer margin.

The swimming-legs closely resemble those of *Ceyloniella armata.* In the 1st leg (Text-fig. 80, E) one seta on the inner margin of both the proximal and distal segments of the endopod is modified and terminates in a comb; the spine on the distal inner margin of the 2nd basal segment reaches well beyond the end of the 1st segment of the endopod, whereas in *Ceyloniella armata* it reaches only about two-thirds the length of the 1st segment of the endopod or a little more.

In the 2nd leg (Text-fig. 80, F) the seta arising from the inner margin of the proximal segment of the endopod is spine-like as in *C. armata*; but in the present form the proximal seta on the inner margin of the distal segment is also spine-like, whereas in *C. armata* it is plumose. In both species the setal formula is identical, namely—

	Endopod.		Exopod.		
	1.	2.	1.	2.	3.
P2	1	3, 2, 1	0	1	1, 2, 3
P3	1	2, 2, 1	0	1	1, 2, 3
P4	1	1, 2, 1	0	1	1, 2, 3

but whereas in *C. armata* the two setæ arising from the distal end of the 2nd segment of the endopod of the 2nd leg are subequal and well developed, in *C. nicobarica* the inner of these two seta is rudimentary.

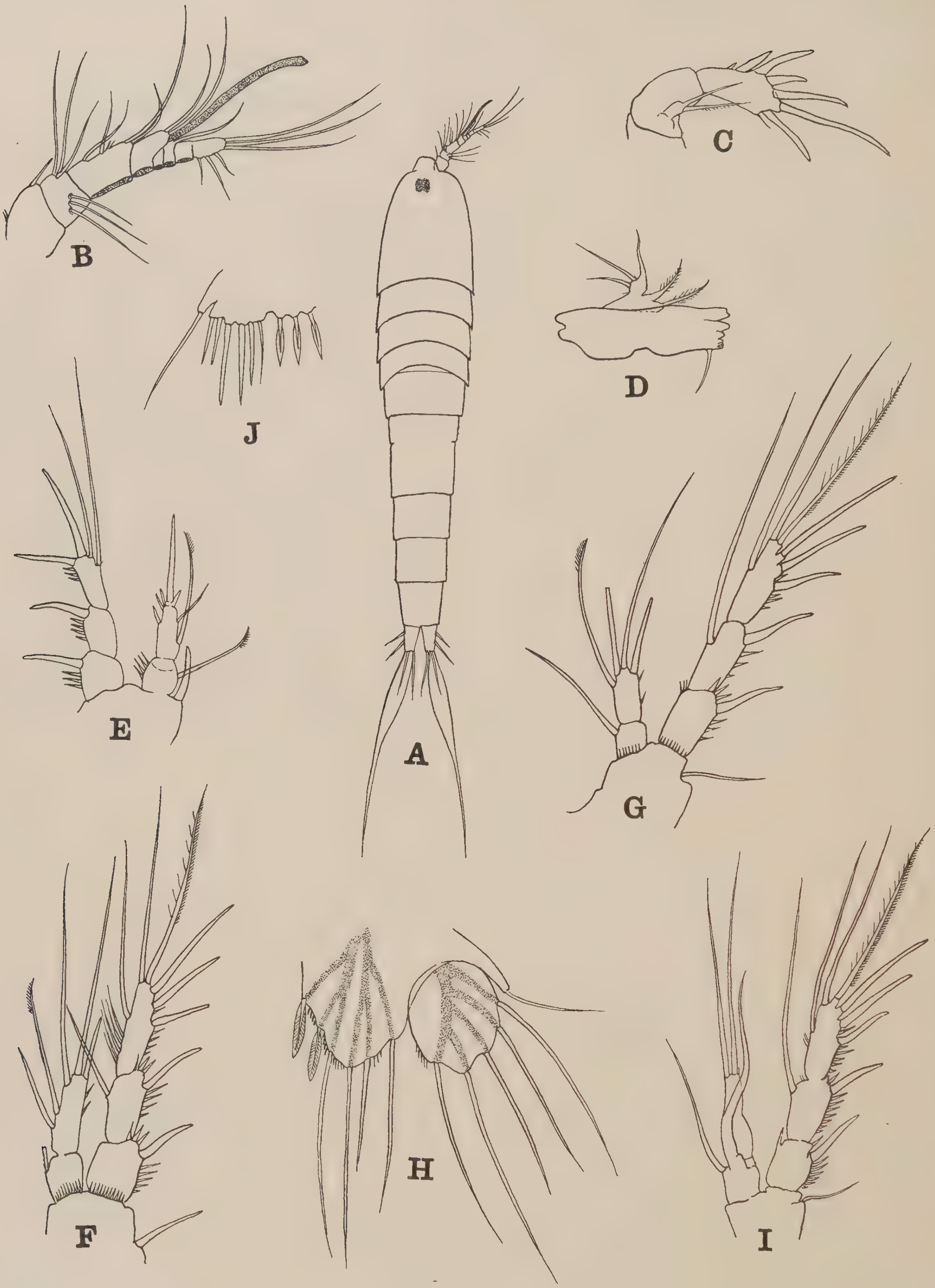
In the 4th leg (Text-fig. 80, G) the endopod is considerably shorter than in *C. armata*, and reaches only just beyond the level of the joint between the 1st and 2nd segments of the exopod.

In the 5th leg (Text-fig. 80, H) the general structure is as in *C. armata*; the distal segment bears five setæ, but the segment itself is broader in proportion to its length.

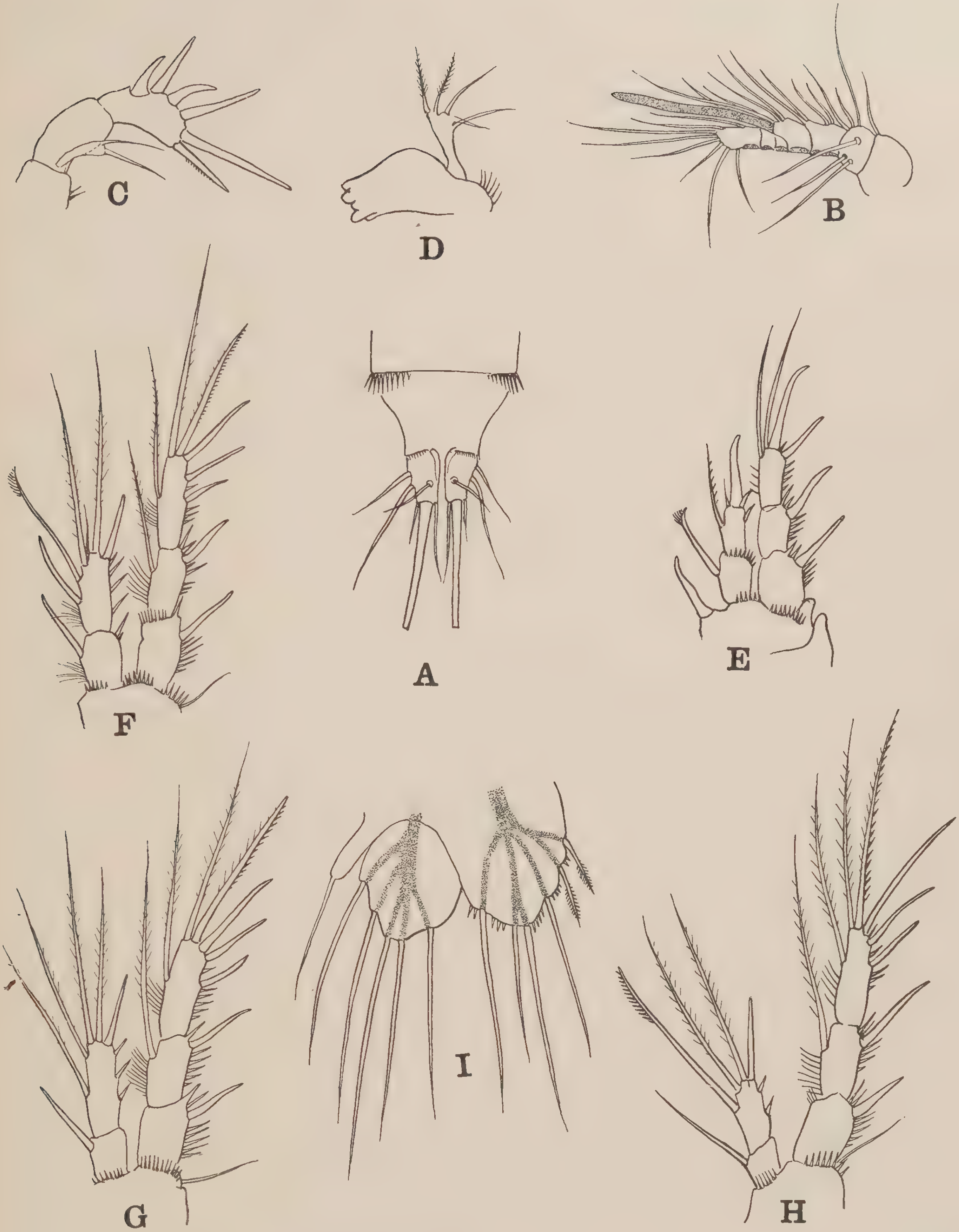
Ovigerous examples carried a single egg-sac with 16–18 ova.

♂. Associated with these females was a male, that also exhibited certain small differences from the male of *C. armata*.

In the 3rd leg (Text-fig. 80, I) the 2nd segment of the endopod is very short, and the elongate S-shaped process appears to spring from the basal segment.



Text-fig. 80.—*Ceyloniella nicobarica* sp. nov. a, Female, dorsal view. b, 1st antenna, female. c, 2nd antenna, female. d, Mandible, female. e, 1st leg, female. f, 3rd leg, female. g, 4th leg, female. h, 5th leg, female. i, 3rd leg, male. j, 5th leg, male.



TEXT-FIG. 81.—*Ceyloniella nicobarica* sp. nov., var., ♀. A, Anal segment and furcal rami. B, 1st antenna. C, 2nd antenna. D, Mandible. E, 1st leg. F, 2nd leg. G, 3rd leg. H, 4th leg. I, 5th leg.

In the 5th leg (Text-fig. 80, J) five of the six setæ arising from the outer lobe, instead of being delicate and flexible, appear to be stiff and spine-like.

Distribution.—The Nicobar Islands; in an exposed area.

Ceyloniella nicobarica sp. nov., var. (Text-fig. 81, A–I.)

Occurrence.—Nankauri Harbour, Nicobar Islands; several females. Addu Atoll, Maldive Archipelago, in weed washings; a few females.

Descriptive Notes.—Total length, 1·014 mm.

The proportional lengths of the anterior and posterior regions are very similar to those of the type form, being 46 to 54. The 3rd segment of the abdomen appears to be somewhat longer, and the anal segment slightly shorter than in the typical form, the proportional lengths of the segments of the posterior region being as follows:

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
13	26	21	15	15	10 = 100

The rostrum is short and pyriform, with the anterior end rounded and deflexed. The posterior margins of the abdominal segments are armed in the lateral region with a row of spinules, running parallel to the margin; a row of small spinules runs along the articulation of the furcal rami. The anal segment appears to be more sharply tapered than in the typical form, and the 2nd furcal seta is simple and is not expanded.

The 1st and 2nd antennæ and the mouth-parts appear to be similar to those of the typical form.

In the 1st leg the 2nd segment of the endopod bears only a single plumose seta on its inner margin, whereas in the typical form there are two setæ, the proximal being comb-like at the tip. In this respect this variety presents the same difference from the typical form as the smaller form *minor* does to the f. *major* of *C. armata* (Claus) (*cf.* Text-figs. 77, D, and 79, C of *C. armata* and Text-figs. 80, E, and 81, E of *C. nicobarica*).

In the 2nd leg the inner seta on the 1st segment of the endopod and the proximal inner seta of the 2nd segment are both spine-like; the inner of the two setæ arising from the distal margin of the segment is obsolescent.

The 3rd and 4th legs resemble those of the typical form.

The 5th leg exhibits the same general characters, but the distal free segment is somewhat more elongated than in the typical form, and is intermediate between this form and that of *C. armata*.

As in the typical form, the ovigerous females were carrying a single egg-sac containing from 16–18 ova.

Distribution.—At present known only from the Nicobar Islands and the Maldive Archipelago; in both regions in calm water.

Family Cletodidæ.

Genus *Laophontella* Thompson and A. Scott.

Laophontella, Thompson and A. Scott, 1903, p. 266; Monard, 1927, p. 168.

This genus was created by Thompson and A. Scott (*loc. cit.*) to accommodate a species, *Laophontella typica*, that was taken in Pearl Oyster washings on the Ceylon Pearl Banks. A second species, that in my opinion should be referred to this genus, was described by Willey (1935, p. 84, figs. 127–148) under the name *Phyllopodopsyllus armatus* from Bermuda.

Laophontella armata (Willey), var. *indica* nov. (Text-fig. 82, A–M, ♀; Text-fig. 83, A–G, ♂.)

Occurrence.—Addu Atoll, Maldive Archipelago, in weed-washings; two females. Camorta Island, Nicobar Islands, in weed-washings; a single male.

Descriptive Notes.—♀. Total length, 0·74–0·78 mm.

The proportional lengths of the anterior and posterior regions of the body (Text-fig. 82, A) are as 53 to 47. The cephalosome is large, and at the anterior end is bent sharply downwards and is produced in a stout spinous process; when viewed from the dorsal side the anterior end appears to be truncated. The postero-lateral angles of the cephalosome are produced on each side in a stout spinous process. The four following segments are of approximately equal length, and are similarly produced into backwardly directed processes in the postero-lateral region. There is no marked difference in width between the segments of the anterior and posterior regions of the body, the whole gradually tapering towards the posterior end. The abdominal segments (Text-fig. 82, B) are also produced in spinous processes laterally. The segments of the posterior region have the following proportional lengths:

Segment Th. 5.	Abd. 1–2.	3.	4.	5.	Furca.
16	30	13	12	13	16 = 100

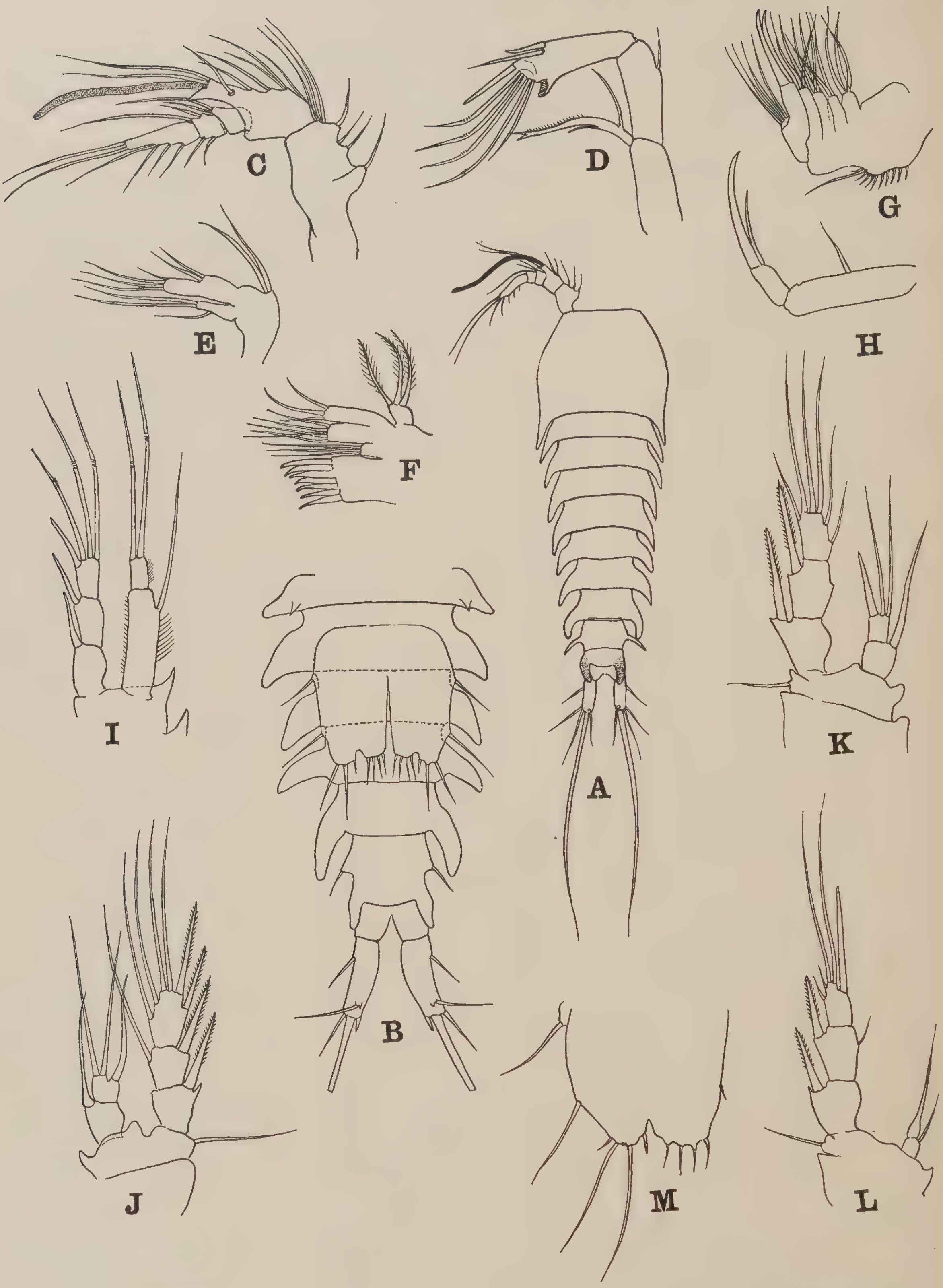
The line of demarcation between the 1st and 2nd abdominal segments is well marked across the dorsal aspect. The furcal rami are slightly divergent and bear the usual number of setæ, the 2nd being by far the longest and strongest.

The 1st antenna (Text-fig. 82, C) consists of five segments; the proximal stout portion is composed of two segments and the more slender distal part of three. The 1st segment is comparatively narrow in its proximal half and then expands distally; a short projection bearing a seta is situated about half-way along the anterior margin. The 2nd segment, which bears numerous setæ, is produced at its distal end in an overhanging spine-like process, from which the sensory filament arises. Of the three distal segments, comprising the slender part of the antennule, the last is by far the longest. Willey, in his account of this appendage (*loc. cit.*, p. 84, fig. 132), remarks: "The precise details of the antennule, in all planes, are not easy to express with the necessary brevity; seen from below it is five-jointed, the proximal joints coalesced into a single segment produced at the end into a two-horned process bearing the sensory filament." A comparison of Willey's fig. 132 and Text-fig. 82, C, clearly indicates the similarity between his example and mine, in spite of the apparently different segmentation.

In the 2nd antenna (Text-fig. 82, D) the main ramus consists of three segments, of which the last is produced distally on its posterior margin in a curved claw-like process, and bears at its distal end three spines, four geniculate setæ and a straight seta. The exopod arises between the 1st and 2nd segments, as in *Phyllopodopsyllus*, and consists of a single segment that is long and tapering; it is fringed along the anterior margin with a row of minute spinules. It bears a seta on the anterior margin near the base and a very small one on the posterior margin at about one-third of its length; distally it terminates in two very small setæ.

The mandible, maxillæ and maxilliped (Text-fig. 82, E–H) appear to resemble those of *Phyllopodopsyllus*.

In the 1st leg (Text-fig. 82, I) the rami are moderately stout and are non-prehensile;



Text-fig. 82.—*Laophontella armata* (Willey), var. *indica* nov., ♀. A, Female, dorsal view. B, Abdomen, dorsal view. C, 1st antenna. D, 2nd antenna. E, Mandibular palp. F, 1st maxilla. G, 2nd maxilla. H, Maxilliped. I, 1st leg. J, 2nd leg. K, 3rd leg. L, 4th leg. M, 5th leg.

the exopod is composed of three segments and the endopod of two, and, as in *Laophontella typica*, they are of equal length. The 1st and 2nd segments of the exopod each bear a marginal spine, but have no seta on the inner border; the 3rd segment bears a marginal spine and three geniculate setæ. The proximal segment of the endopod is about four times the length of the distal, and bears a single inner seta at about three-fourths of its length; the distal segment bears two geniculate setæ.

The 2nd and 3rd legs (Text-fig. 82, J, K) have comparatively broad rami; the exopod consists of three segments and the endopod of two only. The rami are of remarkably unequal length, the endopod being very short. In both legs the 1st segment of the exopod bears no inner seta and the outer marginal spine is strong and serrated; the 2nd segment bears a strong serrated marginal spine and an inner seta. The distal segment is markedly different in the two legs; in the 2nd leg this segment bears two stout serrated spines on the outer margin and four setæ, two distally and two on the inner aspect; in the 3rd leg the marginal spines are replaced by delicate setæ, one of which arises at the distal outer angle, three setæ spring from the distal end and two from the inner margin. In both legs the proximal segment of the endopod bears a single stout spine-like seta, and the distal segment bears two setæ at the distal end and one stout spine-like seta on the outer margin near the distal angle.

In the 4th leg (Text-fig. 83, L) the proximal segment of the exopod bears a stout serrated marginal spine, but is devoid of any seta on the inner border; the 2nd segment bears both a serrate spine and an inner seta; on the 3rd segment the marginal spines are replaced by two small, delicate setæ, two normal setæ arise from the distal end and a strong spine springs from the distal inner angle. The endopod consists of a short single segment, bearing a delicate seta on its inner border, and a well-developed seta with a bulbous base arises distally, this bulbous swelling may perhaps represent the reduced 2nd segment of the ramus.

In the 5th leg (Text-fig. 82, M) the whole appendage forms a large foliaceous plate, without any division into two segments, but its formation by the fusion of two segments is clearly indicated by a notch in the posterior border. The inner part of the plate, representing the proximal segment, bears four equal setæ at the distal end and a fifth, much smaller seta on the inner margin. The outer part of the plate, representing the distal segment, bears a small seta on the inner margin near the apex, two well-developed setæ distally, a very small seta just external to these two, and another well-developed seta at some distance on the outer border. A sixth seta near the basal part of the outer border represents the outer process of the basal segment.

♂. Total length, 0·76 mm.

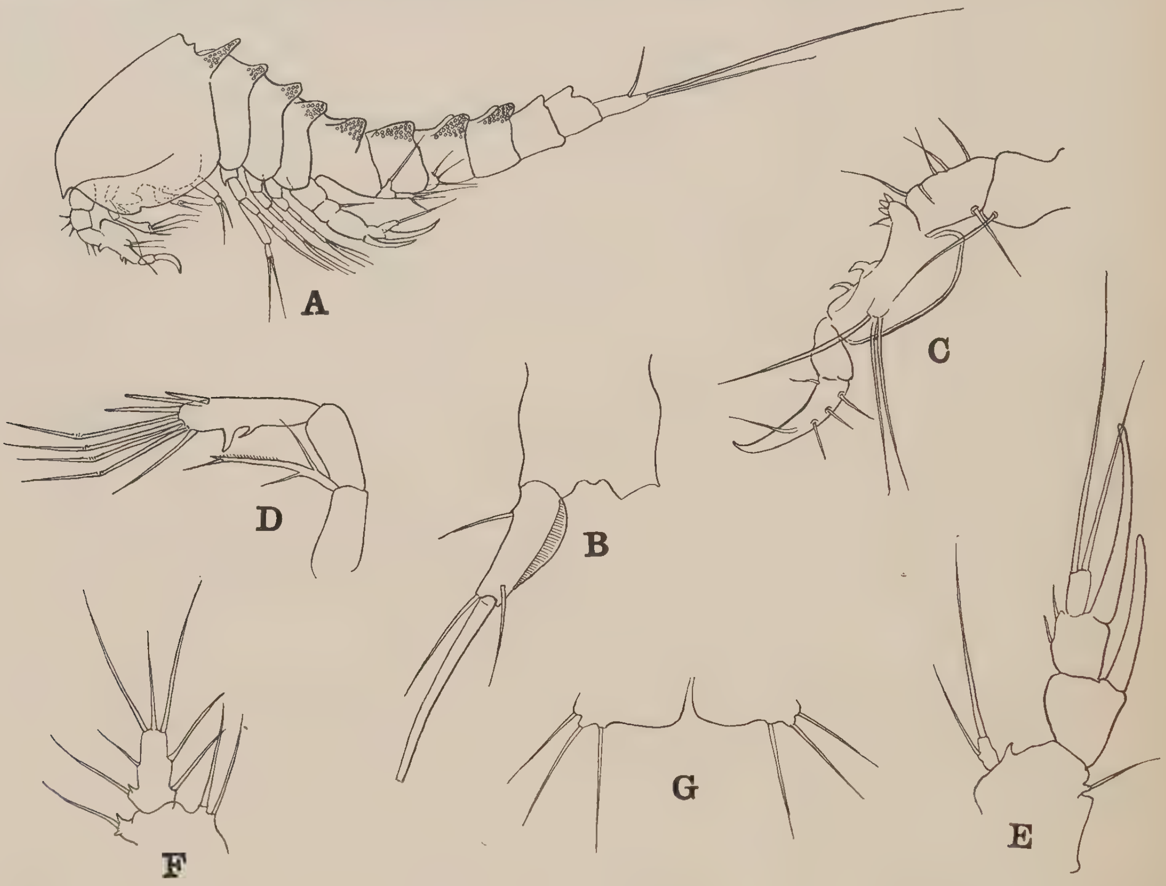
In its general appearance and bodily characters (Text-fig. 83, A) the male closely resembles the female. The furcal rami (Text-fig. 83, B) are divergent and a lamellar expansion runs down the inner aspect, as in the genus *Phyllopodopsyllus*.

The 1st antenna (Text-fig. 83, C) is modified to form a powerful grasping organ; the hand is dilated, and at the proximal end of the anterior margin is produced in a blunt process that bears a series of small pointed prominences; two claw-like processes arise from the distal half of this margin. The part beyond the hinge-joint consists of two segments, the distal one being large and claw-like.

The 2nd antenna (Text-fig. 83, D) closely resembles that of the female, but on the posterior margin of the terminal segment there are two claw-like processes instead of one.

The 4th leg (Text-fig. 83, E) is remarkably strong and forms a powerful clasping organ. The 1st segment of the exopod is armed with a powerful marginal spine, that reaches well beyond the extreme tip of the ramus; the 2nd segment bears a similar spine externally and two small delicate setæ on the inner margin; the distal segment bears two setæ distally. The endopod, as in the female, is much reduced, and consists of only a single segment, bearing two setæ.

The 5th leg (Text-fig. 83, F) is comparatively normal in structure. It consists of separate segments. The proximal segment is but slightly produced and bears two subequal setæ; the distal segment is about two-and-a-half times as long as broad and bears seven setæ, which are so arranged as to give the appearance as if the joint was composed of three fused segments; two setæ, of which the more distal is small and delicate, arise from the outer margin, and opposite to these two subequal setæ spring from the inner border; three setæ, of which the middle is small, arise from the distal border. In his account of the typical form Willey notes that this segment differed on the two sides, having six setæ on one side and only five on the other.



Text-fig. 83.—*Laophontella armata* (Willey), var. *indica* nov., ♂. A, Male, lateral view. B, Anal segment and furcal ramus. C, 1st antenna. D, 2nd antenna. E, 4th leg. F, 5th leg. G, Genital segment.

The genital aperture is guarded by a wide flap, that at its distal, outer angle bears three setæ.

I have no hesitation in referring these examples to Willey's species. Willey has referred his form to the genus *Phyllopodopsyllus*, though he notes the resemblance to Thompson and Scott's genus *Laophontella*. While the species does not exactly conform to either genus, as at present defined, it seems to me that it has most affinity with *Laophontella*. It resembles this latter genus in the reduction of the number of segments in the 1st antenna to five instead of eight; furthermore, the 1st leg is clearly not prehensile and the two rami are of equal length. The setal formula for the swimming-legs is entirely different, as is shown below:

		Endopod.		Exopod.		
		1.	2.	1.	2.	3.
Laophontella . .	P2	1	0, 2, 1	0	1	2, 2, 2
	P3	1	0, 2, 1	0	1	2, 2, 2
	P4	1	0, 1, 0	0	1	1, 2, 2
Phyllopodopsyllus .	P2	0	0, 2, 1	1	0	1, 2, 2
	P3	1	0, 2, 1	1	0	2, 2, 2
	P4	1	0, 2, 1	1	1	2, 2, 2

The 4th leg, though stronger than the preceding three, is not markedly longer, as in *Phyllopodopsyllus*, and although the 5th leg in the female forms a single plate, that somewhat resembles that of *Phyllopodopsyllus*, this resemblance is superficial rather than real, since in the present examples there is a clear trace of both segments being present, whereas in *Phyllopodopsyllus* the plate shows no trace of division.

DISTRIBUTION.—The typical form is at present known only from Bermuda (Willey), and the variety *indica* from the Nicobar and Maldive Archipelagos.

Genus *Orthopsyllus* Brady, Sars. (*Lilljeborgia* Claus nom. preocc.)

Orthopsyllus, Sars, 1903–11, p. 288.

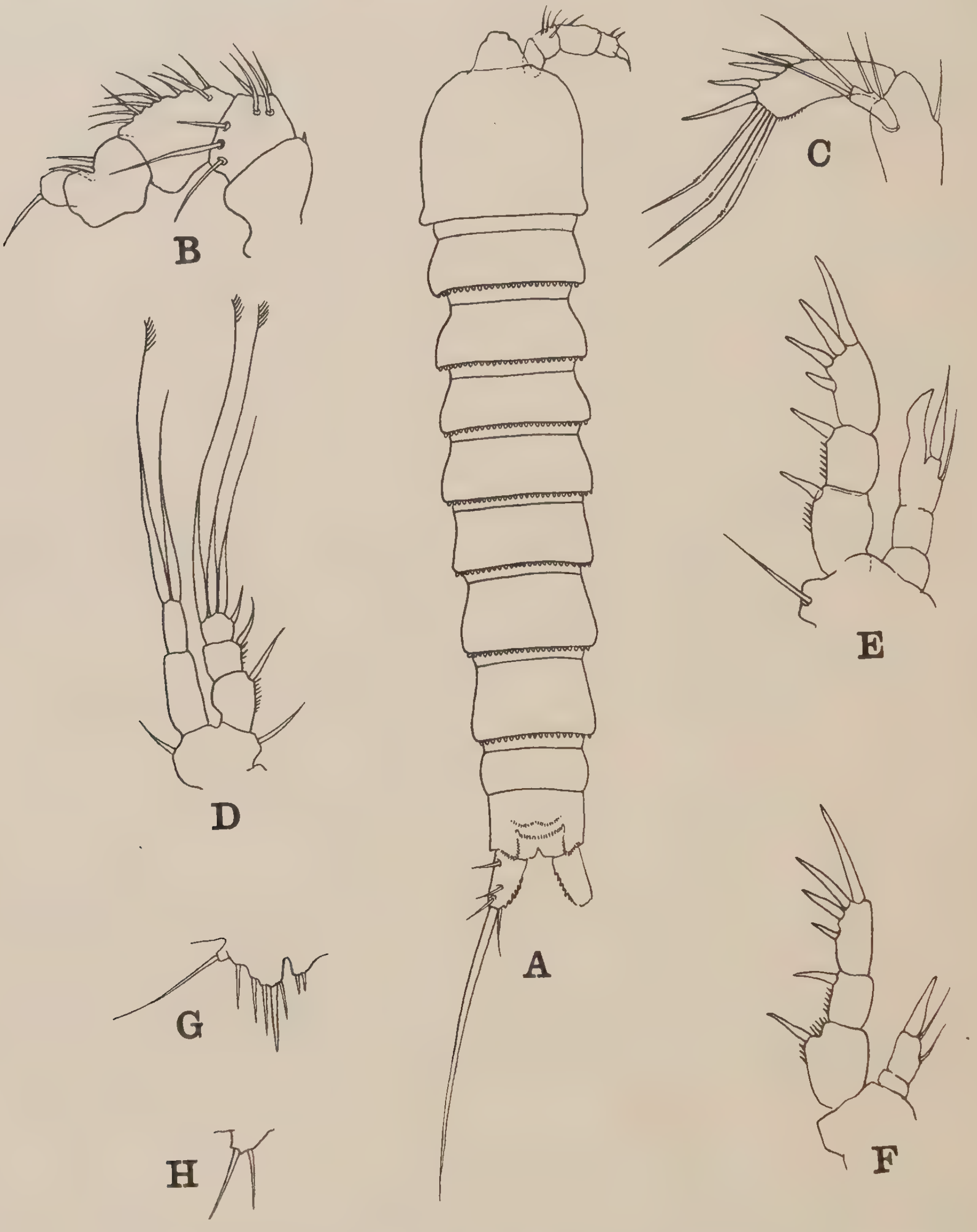
Up to the present time only three species have been attributed to this genus, namely *Orthopsyllus linearis* (Claus), *O. propinquus* Monard and *O. wallini* Lang. Thompson and A. Scott (1903, p. 267), under the name *Cletodes linearis* (Claus), have recorded the occurrence of the first of these species in the Gulf of Suez and the Gulf of Manaar; an example of what appears to be a different species was taken by the "Investigator", only the male being obtained.

Orthopsyllus sp. (Text-fig. 84, A–H.)

OCCURRENCE.—"Investigator" Station 630, Nankauri Island, west side, Nicobar Islands, in weed washings; a single male, immature.

DESCRIPTIVE NOTES.—♂. Total length, 0·89 mm.

The body (Text-fig. 84, A) is linear in form and tapers but little towards the posterior end. The cephalosome is about as long as broad, and is equal in length to the two following segments only, instead of three as in *O. linearis* (Claus). The rostrum is broad and bluntly rounded. All the free thoracic segments and the first three abdominal segments are bordered along the posterior margin with a row of denticles. The 4th and 5th abdominal segments appear to be incompletely separated; a row of fine spinules runs along the line of articulation of the furcal rami and then, passing forwards, turns across the anal operculum, while a second bow-shaped row of still smaller spinules runs across the dorsal aspect of the 5th segment about the middle of its length. The inner margin of each furcal ramus is serrated, and the 2nd furcal seta is long and stout; all the other setæ arising from the furca are small and delicate. The proportional lengths of the anterior and posterior regions of the body are as 48 to 52, and the proportional lengths of the segments of the posterior region are as follows:



TEXT-FIG. 84.—*Orthopsyllus* sp., ♂. A, Male, dorsal view. B, 1st antenna. C, 2nd antenna. D, 1st leg. E, 3rd leg. F, 4th leg. G, 5th leg. H, Genital armature.

Segment Th. 5.	Abd. 1	2.	3.	4.	5.	Furca.
15	17	17	17	7	14	13 = 100

The 1st antenna (Text-fig. 84, B) is modified to form a grasping-organ, but the lines of demarcation of the terminal segments were by no means clear.

The 2nd antenna (Text-fig. 84, C) closely resembles that of *Orthopsyllus linearis*; the terminal segment bears four spines and three geniculate setæ, and the exopod is composed of a single segment bearing four setæ.

In the 1st leg (Text-fig. 84, D) the exopod consists of three segments, and the endopod of two only. The exopod reaches to the middle of the 2nd segment of the endopod, whereas in *O. linearis* it barely reaches to the distal end of the proximal segment. The distal segment of the exopod bears a delicate seta-like marginal spine and three setæ arise from the distal border; all three setæ are expanded at their bases and the inner two are ciliate at the tips. The distal segment of the endopod bears two setæ at the distal end, and of these both are dilated at the base and the inner is ciliate at the tip.

In the 3rd leg (Text-fig. 84, E) the endopod is modified. The exopod consists of three segments, of which the 1st and 3rd are approximately equal in length and the 2nd somewhat shorter; the first two segments each bear a stout marginal spine, and the 3rd bears four stout spines, that increase in size distally; there are no inner setæ on either segment. The endopod is three-jointed, and the first two are without any seta; the 3rd bears a delicate seta on its inner margin and a stouter, "spathulate" seta distally, the distal inner portion of the segment is produced in a large sickle-shaped process.

In the 4th leg (Text-fig. 84, F) the exopod resembles that of the 3rd leg; the endopod, however, consists of two segments only, of which the proximal is quite small; the distal segment bears a delicate seta on the inner margin and a small seta and a stout spinous process at the distal end, as in *O. linearis*.

In the 5th leg (Text-fig. 84, G) the two segments are not differentiated, thus resembling the condition found in the female of *O. linearis*. The small inner projection of the plate, corresponding to the proximal segment, bears two small spines, and the larger outer projection, corresponding to the distal segment, bears five spines, of which the 4th, counting from the outer side, is much larger than the others, which are subequal.

The imperfect separation of the segments of the 1st antenna and the absence of differentiation of the 5th foot seems to suggest that the specimen is not quite mature; this would also account for the imperfect differentiation of the endopod of the 3rd leg. It is thus impossible to determine whether the specimen is an immature stage of a known form or of a new species; the presence of five spines on the outer part of the 5th leg would appear to place the specimen in a closer relationship to *O. linearis* and *O. propinquus* than to *O. wallini*.

Orthopsyllus linearis (Claus).

OCCURRENCE.—Sta. 45, South Arabian Coast, depth 40 m., in mud; 1 female, 2 males.

DISTRIBUTION.—This species, as T. Scott (1912, p. 522) has pointed out, has a very wide distribution. It has now been recorded from the S. Orkneys and the Antarctic Seas as far south as 60° 43′ 42″ S. (T. Scott), the Ceylon Pearl Banks and the Suez Canal (Thompson and A. Scott), the S. Arabian Coast (present record), the Gulf of Guinea (T. Scott), the Mediterranean Sea (Claus, Brian), the coasts of the British Isles (Brady, Norman and T. Scott), the Irish coast (Farran), the coasts of Norway (Sars) and Nova Zembla (T. and A. Scott).

Genus *Enhydrosoma* Boeck.

Enhydrosoma nicobarica sp. nov. (Text-fig. 85, A–J.)

Occurrence.—Nankauri Harbour, Nicobar Islands, in weed-washings; a single female.

Descriptive Notes.—♀. Total length, 0·63 mm.

The proportional lengths of the cephalothorax and abdomen are as 53 to 47. The rostrum (Text-fig. 85, B) is prominent and depressed, but towards its apex it becomes upcurved, as in *Cletodes curvirostris* Scott. The cephalosome (Text-fig. 85, A) is massive and sub-quadrangular in shape. Viewed from the dorsal aspect each segment of the body, with the exception of the last, appears to be produced backwards in the lateral region in a pointed process. There is no marked demarcation between the anterior and posterior regions. The cephalosome, all the thoracic segments and the first two segments of the abdomen are adorned with a series of small, rounded tubercles on the posterior margin. The 3rd abdominal segment is devoid of this ornamentation and the 4th and 5th abdominal segments are still fused together, indicating that the specimen was not quite fully developed. The proportional lengths of the segments of the abdomen are as follows:

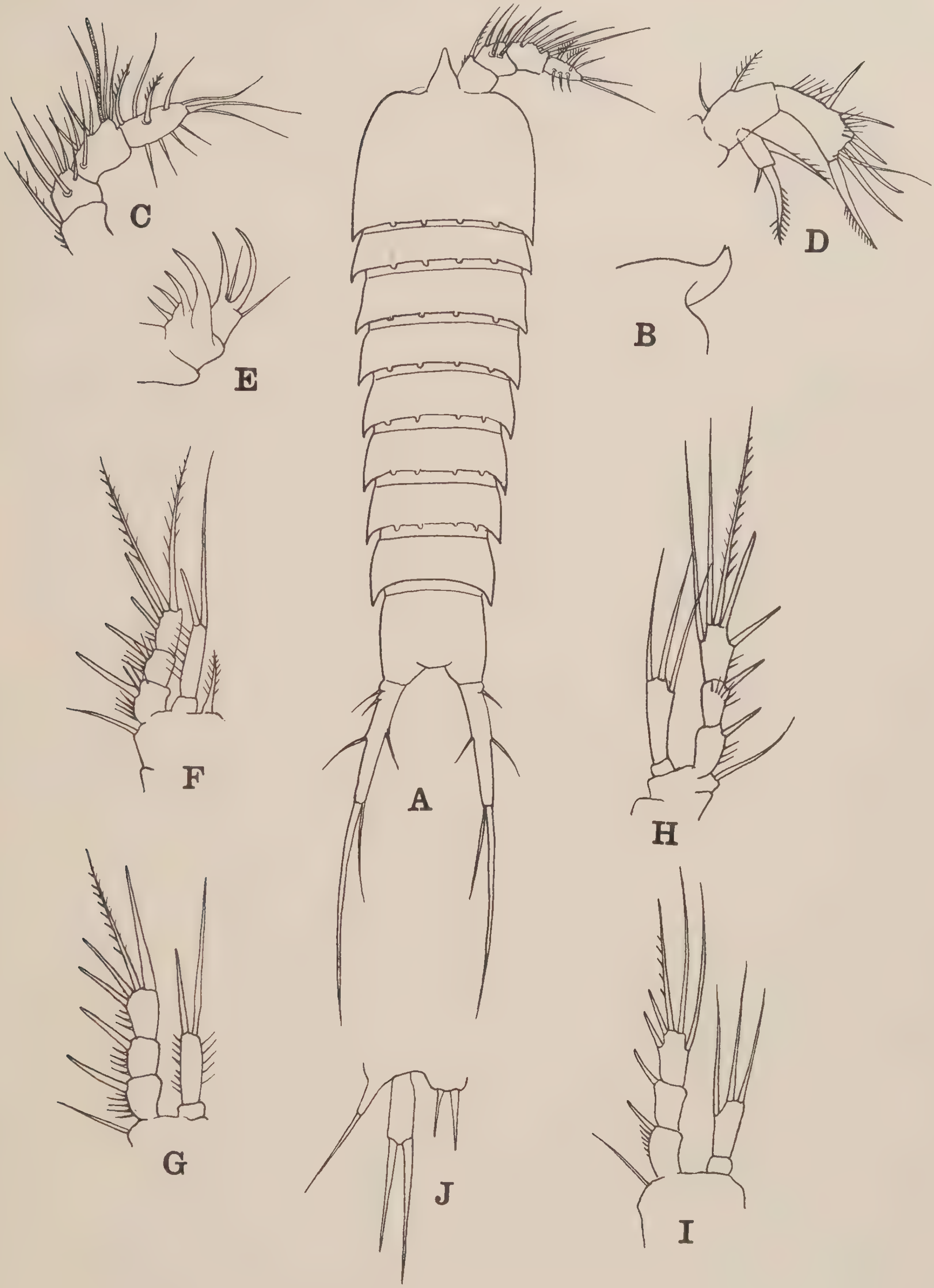
Segment Abd. 1.	2.	3.	4–5.	Furca.
17	15	12	26	30 = 100

The furcal rami are very long and narrow and are slightly incurved, as in *Enhydrosoma longifurcatum* Sars and *E. migoti* Monard; two small unequal setæ arise from the outer side near the base and a third, somewhat larger, from about the middle of the ramus; a single seta arises from the inner margin, slightly proximally to the outer seta, and two markedly unequal setæ spring from the distal extremity.

The 1st antenna (Text-fig. 85, C) consists of only four segments, segments 3 and 4 being fused, as in *E. migoti*; the 2nd segment is the shortest and the other three are of approximately equal length. The 1st segment bears a row of small spinules along its anterior margin and a single pectinate seta springs from the distal end. The 3rd segment carries a single sensory filament and the 4th segment bears two pectinate setæ, one near the base and the other about half-way along its length.

In the 2nd antenna (Text-fig. 85, D) the main ramus consists of three segments; the terminal segments bears a series of six spines, the one arising from the distal posterior margin being the largest and serrated along its border. The exopod is composed of a single segment, that bears a seta on its anterior margin about half-way along its length and two, markedly unequal, setæ at the distal end.

In the 1st leg (Text-fig. 85, F) the exopod consists of three subequal segments, that are all fringed along their outer borders with needle-like spinules. The 1st and 2nd segments each bear a single marginal spine; the 3rd segment bears two marginal spines, and two setæ arise from the distal end. The endopod is slightly shorter than the exopod and is composed of two markedly unequal segments; the proximal is quite small and is devoid of a seta, and the distal is cylindrical and bears a long seta and a spine at the distal end. A stout pectinate seta arises from the 2nd basal segment internal to the endopod.



Text-fig. 85.—*Enhydrosoma nicobarica* sp. nov. A, Male, dorsal view. B, Rostrum, lateral view. C, 1st antenna. D, 2nd antenna. E, 2nd maxilla. F, 1st leg. G, 2nd leg. H, 3rd leg. I, 4th leg. J, 5th leg.

In the 2nd–4th legs (Text-fig. 85, G, H and I) the endopod is composed of only two segments and the exopod of three. The setal formula of these legs is as follows :

	Endopod.		Exopod.		
	1.	2.	1.	2.	3.
P2	0	2	0	0	1, 1, 2
P3	0	3	0	0	2, 1, 2
P4	0	3	0	0	2, 1, 2

In the 2nd leg the inner seta that arises from the distal end of the 3rd segment of the exopod is modified into a stout spine, and the inner seta arising from the distal end of the 2nd segment of the endopod is also modified and forms a spear-like spine.

In the 5th leg (Text-fig. 85, J) the two segments are fully demarcated ; the proximal segment is produced in a small sub-rectangular prominence, from which arise two unequal spines ; externally it is produced in a cylindriform process that bears a single seta. The distal segment is about twice as long as broad and bears two subequal spine-like setæ.

DISTRIBUTION.—The Nicobar Islands.

Family METIDÆ.

Genus *Metis* Philippi. (*Ilyopsyllus* Brady and Robertson.)

Metis, Sars, 1903–11, p. 344 ; Gurney, 1927*c*, p. 567.

Metis jusseaumei (Richard) was recorded by A. Scott (1902) under the name *Ilyopsyllus affinis* T. Scott from the Gulf of Suez, and by Thompson and A. Scott from the same area. It was later taken, according to A. Scott (1909), in the Malay Archipelago. Gurney (1927*c*) has recorded this species and a second one, to which he gave the name *Metis pallida*, from the Suez Canal.

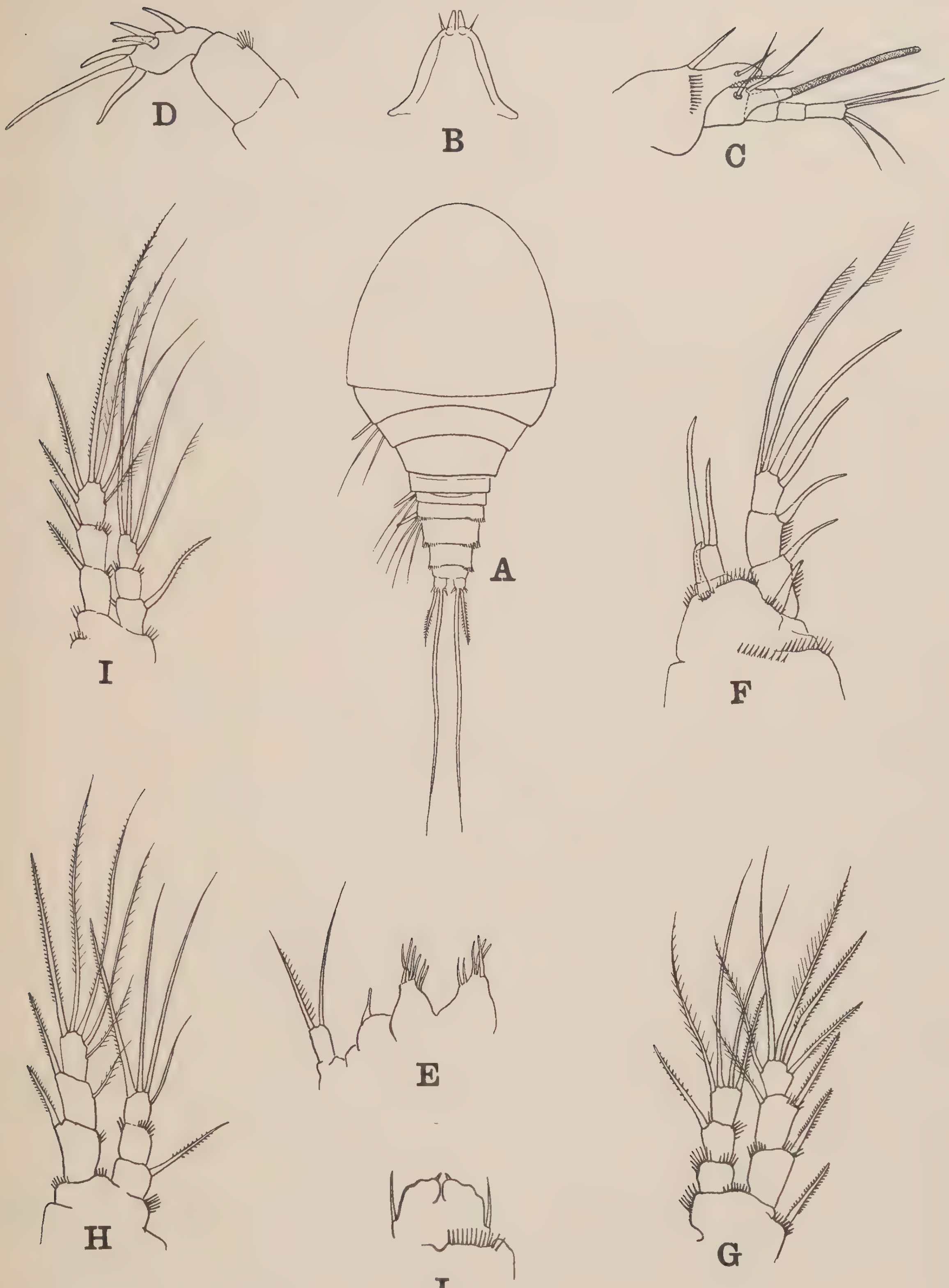
Metis jusseaumei (Richard).

Ilyopsyllus jusseaumei, Richard, 1892, p. 69.
Ilyopsyllus affinis, T. Scott, 1894, p. 101, pl. xi, figs. 4–17.
Ilyopsyllus sarsi, Sharpe, 1910, p. 423, fig. 18, *a–i*.
Metis jusseaumei, Gurney, 1927*c*, p. 571, figs. 167, A–E.
Metis sarsi, Monard, 1928*a*, p. 441, fig. xlviii, 3.
Metis jusseaumei, Wilson, 1932, p. 308, fig. 186, *a–i*.

f. *minor*. (Text-fig. 86, A–J, ♀.)

OCCURRENCE.—Nankauri Harbour, Nicobar Islands, in weed-washings. Addu Atoll, Maldive Archipelago, in weed-washings. Several examples of both sexes.

DESCRIPTIVE NOTES.—♀. Total length, 0·45 mm. This compares very closely with the dimensions given by previous observers ; thus T. Scott gives the size of his examples from the Gulf of Guinea as 0·5 mm. Sharpe gives the length of examples from the Wood's Hole region as 0·5 mm., and Wilson's specimens from Bermuda ranged from 0·35 to 0·5 mm. Specimens from the Mediterranean Sea ranged from 0·5 to 0·54 mm., according to Monard. The proportional lengths of the anterior and posterior regions of the body (Text-fig. 86, A) are as 67 to 33. The body is pyriform in shape, the anterior region being robust and



Text-fig. 86.—*Metis jusseaumei* (Richard), f. *minor*, ♀. A, Female, dorsal view. B, Rostrum. C, 1st antenna. D, 2nd antenna. E, Mouth-parts. F, 1st leg. G, 2nd leg. H, 3rd leg. I, 4th leg. J, 5th leg.

stout, while the posterior region tapers rapidly to the furcal rami. The proportional lengths of the segments of the posterior region are as follows :

Segment	Abd. 1–2.	3.	4.	5.	Furca.
	30	21	21	13	15 = 100

The postero-lateral margins of abdominal segments 2, 3 and 4 are fringed with needle-like spinules. The furcal rami bear at their distal ends two stout setæ, of which the inner is about four times the length of the outer. The outer seta is serrated on both margins. In both this species and *M. ignœa* Philippi the inner seta appears to be liable to variation ; as Gurney (1927*c*, p. 571) has pointed out, both Brady and Scott have described this seta in *M. ignœa* as being broad and flattened in the female, but this was not the case in the specimens examined by him. A. Scott (1902, p. 417), regarding the examples of *M. jusseaumei* obtained in the Gulf of Suez, remarks, " The caudal setæ in the females are not spatulate ". In the examples examined by me from Nankauri Harbour the inner setæ were of about the same thickness at their bases as the outer setæ, thus resembling Gurney's examples of this species from the Suez Canal ; but in specimens from the east side of Camorta Island, also in the Nicobars, the inner seta was greatly thickened, and its diameter at the base was about two-and-a-half times as thick as that of the outer seta.

The proportional lengths of the segments of the 1st antenna (Text-fig. 86, C) are as follows :

Segment 1.	2.	3.	4.	5.
40	10	13	17	20 = 100

According to Gurney (1927*c*, p. 571) the setal formula of the swimming-legs 2 to 4 (Text-fig. 86, G, H and I) are as follows :

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P2	0	0	1, 2, 1	0	1	1, 1, 3
P3	1	0	2, 1, 1	0	1	2, 1, 3
P4	1	0	2, 1, 1	0	1	2, 1, 3

In his figure of the 4th leg, however, he shows no seta on the 2nd segment of the exopod ; this agrees with my examples, in which the setal formula is

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P2	0	1	1, 2, 1	0	1	1, 1, 3
P3	1	0	2, 1, 1	0	1	2, 1, 2
P4	1	0	2, 1, 1	0	0	2, 1, 3

T. Scott (1894, pl. xi, fig. 14) shows the formula of the 3rd leg in his examples to be—

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P3	1	1	2, 2, 1	0	1	2, 1, 3

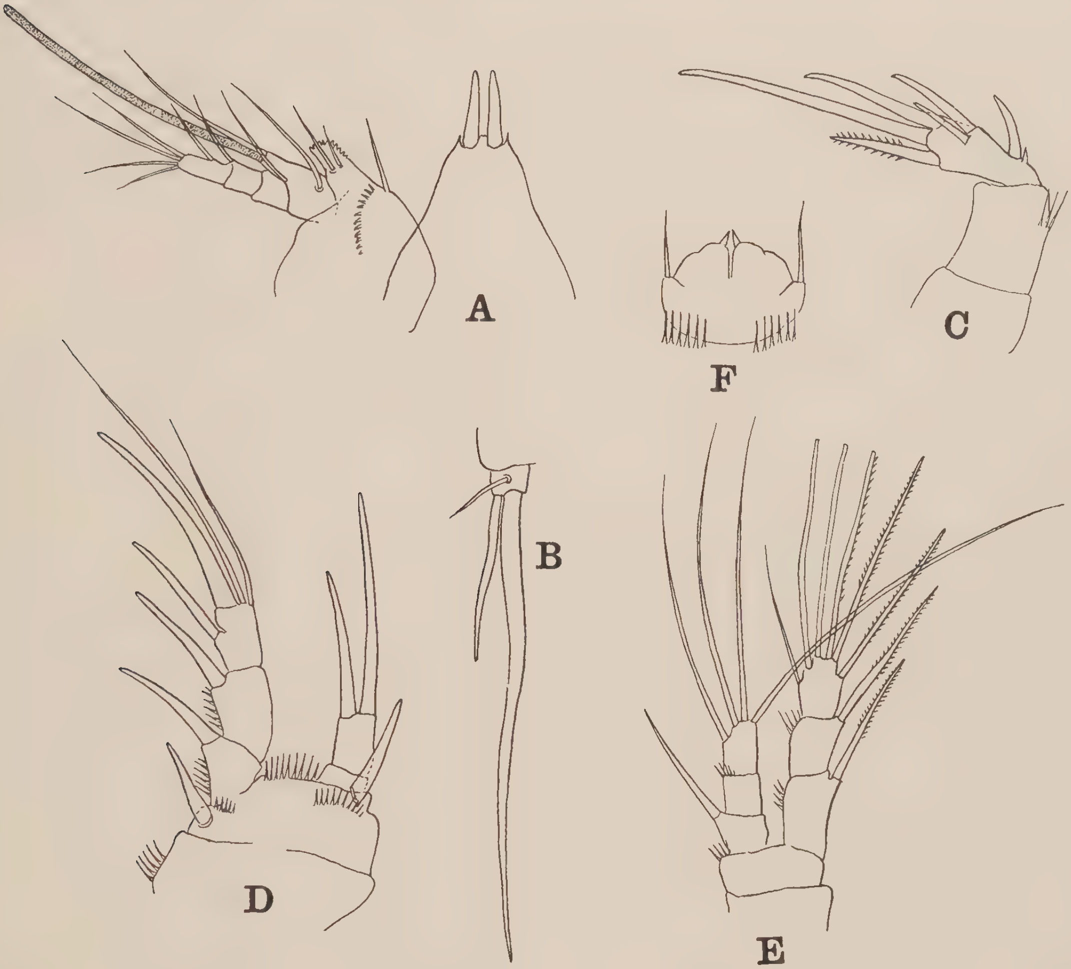
It would thus appear that the number of setæ on the limbs is liable to some degree of variation.

The 5th legs (Text-fig. 86, J) agree very closely with the figure given by Gurney.

In life the colour of these examples was a deep brown.

f. *major*. (Text-fig. 87, A–F, ♀; Text-fig. 88, A–F, ♂.)

In certain examples that were taken in weed-washings on the east side of Camorta Island, Nicobar Islands, the size was very considerably greater and measured no less than 0·82 mm.



TEXT-FIG. 87.—*Metis jusseaumei* (Richard), f. *major*, ♀. A, Rostrum and 1st antenna. B, Furcal ramus. C, 2nd antenna. D, 1st leg. E, 4th leg. F, 5th leg.

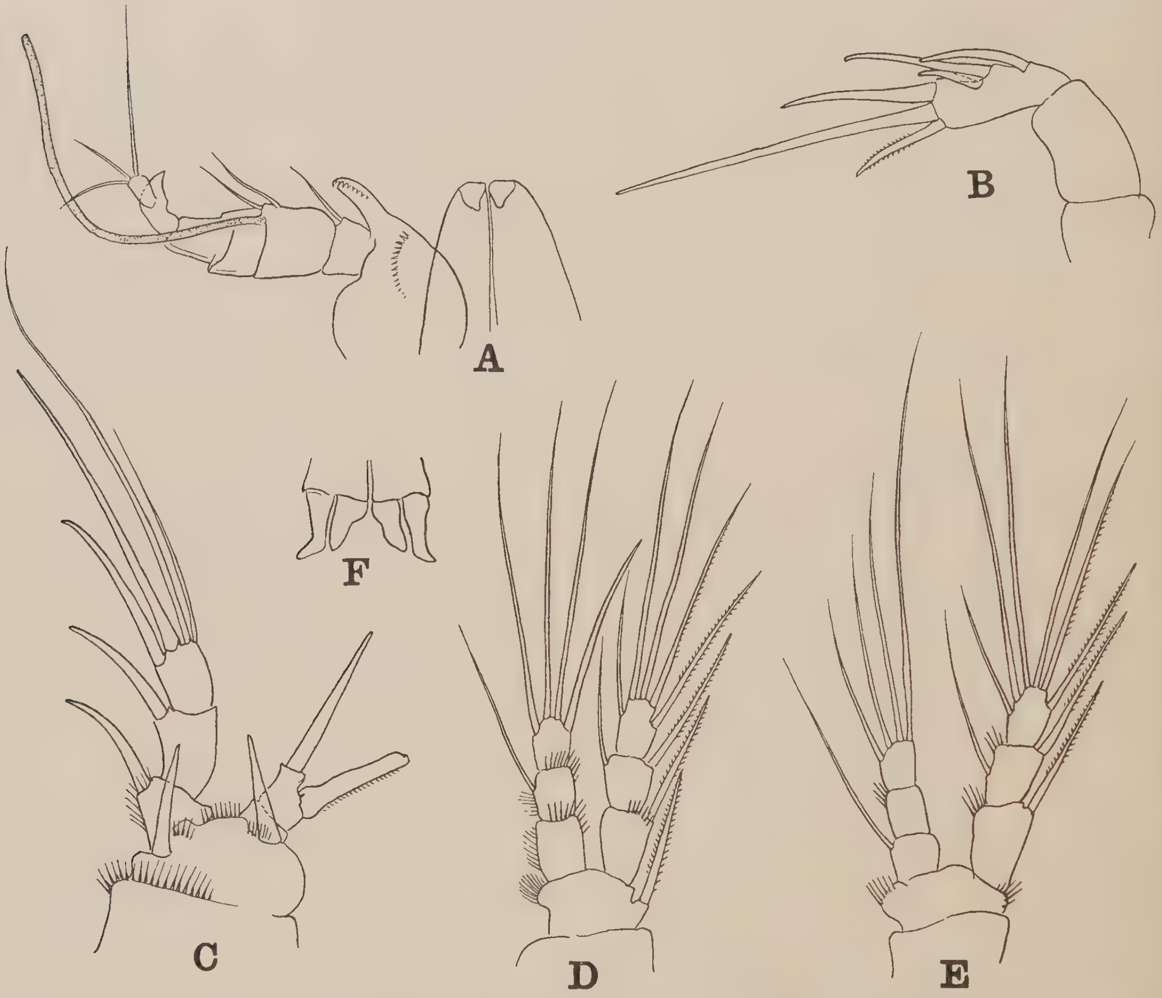
There were certain other small differences of structure. The spines at the extreme tip of the rostrum (Text-fig. 87, A) were considerably longer than in the smaller examples. In the 2nd antenna (Text-fig. 87, C) the spines on the terminal segment, especially that on the extreme distal end, were considerably longer, and the most posterior spine was serrated along both its margins.

The external marginal spines on the exopods of the swimming-legs, and especially on the 4th leg, are longer and, as already mentioned, the inner furcal seta is considerably thickened (Text-fig. 87, B).

♂. Total length, 0·68 mm. This male clearly corresponds to the large female; Gurney (1927*c*, p. 572) gives the size of the male as 0·44 mm., and Wilson's examples measured from 0·3–0·4 mm.

The rostrum (Text-fig. 88, A) in these examples is recurved, and presents the appearance of a pair of pyriform lobes on the ventral aspect.

The 1st antenna (Text-fig. 88, A) consists of seven segments; T. Scott (1894, p. 101) states that in his specimens there were eight, but he shows the large 1st segment as being divided; of this division there was no trace in the present examples.



Text-fig. 88.—*Metis jusseaumei* (Richard), f. *major*, ♂. A, 1st antenna and rostrum. B, 2nd antenna. C, 1st leg. D, 2nd leg. E, 4th leg. F, 5th leg.

In the 2nd antenna (Text-fig. 88, B) the spines on the terminal segment are long, and the last one is serrated, as in the large females.

In the 1st leg (Text-fig. 88, C) the endopod differs somewhat from that of the female; the 2nd segment bears two spines, but of these the inner, which arises from the inner margin and not from the distal border, is very stout and is serrated along its inner border.

The setal formula of the swimming-legs is :

	Endopod.			Exopod.		
	1.	2.	3.	1.	2.	3.
P2	0	1	1, 2, 1	0	1	1, 1, 3
P3	Not seen.					
P4	1	0	2, 1, 1	0	1	2, 1, 3

The 5th pair of legs (Text-fig. 88, F) agrees closely with the descriptions of previous authors.

DISTRIBUTION.—The Malay Archipelago (A. Scott), the Nicobar Islands (present records), the Ceylon Pearl Banks (Thompson and A. Scott), the Maldive Archipelago (present record), the Gulf of Suez (A. Scott, Thompson and A. Scott), the Suez Canal (Gurney), the Mediterranean Sea (Monard), the Gulf of Guinea (T. Scott), the east coast of North America, Wood's Hole region (Sharpe, Wilson).

THE DISTRIBUTION OF THE HARPACTICID COPEPODA.

As Brady (1883, p. 30) has pointed out, "in the Harpacticidæ . . . we find antennæ usually so short that they can be of very little use as swimming organs—this function probably devolving almost entirely on the feet. And as a result of this structure the members of the family haunt chiefly either the muddy sand of the sea-bed, or littoral situations where there is abundance of weed, on the fronds of which they rest and find their food, swimming only fitfully and by short jerks". Certain genera, however, have taken to a pelagic existence, notably *Euterpina*, *Microsetella*, *Macrosetella*, *Miracia*, *Clytemnestra*, *Ægisthus* and *Halithalestris*. Such planktonic forms can easily be distributed throughout the oceans by means of surface currents, the limits of their distribution depending solely on their ability to resist changes of temperature and salinity ; but the possible means of dispersal of other genera and species, that have adopted a littoral or weed-haunting existence, are not so obvious. T. Scott (1912, p. 521) remarks: "The occurrence at places so far distant as the Falklands and South Orkneys of demersal forms identical with, or closely allied to, those of Britain and Norway has a bearing on the question of distribution different from that concerning organisms living freely in the open sea. Such free-swimming species are subject to dispersal over wide areas by tidal and other currents, and numerous examples of such dispersal are indicated or described by various authors ; but the wide distribution of an Harpacticid, such, for example, as *Orthopsyllus linearis* Claus, may not be so easily explained. This Copepod is one of a group which have an elongated and moderately slender body, provided with short appendages that are scarcely, if at all, fitted for swimming, but are rather adapted for living among branching Zoophytes or on the roots and stems of seaweeds. The transporting action of currents can have much less effective influence on the distribution of such species than on species living a free life in the open sea." Gurney (1931, p. 17) has concluded that "in the case of the Harpacticids active migration has probably been very effective in dispersal". We are still ignorant of the habits of many of these small, littoral-haunting forms, but many of them are known to be far more at home crawling among the sand-grains of the sea bottom than swimming in open waters, as for instance *Metis jusseaumei* (Richard), which "swims with a short, jerky motion, and usually sticks to the algæ and débris, but is rarely captured in open water" (Wilson, 1932, p. 310), and yet this species has a range extending from the Malay Archipelago to the east coast of North America. In such forms it seems obvious that active migration, such as Gurney postulates, could only be carried out along the margins of the continents, and that we must look for some other means of dispersal across the wide spaces of the ocean basins.

Monard (1928*a*, p. 268 ; 1937, p. 9) has pointed out that many of the Harpacticids are ubiquitous and can exist in a variety of habitats, and that it is precisely those species that inhabit such a variety of habitats that are the most widely distributed. A study of the group reveals that the species most frequently captured are usually those that are to be found living on algæ, and especially on algæ growing in exposed situations ; and, among others found in such a habitat, he cites :

Longipedia minor, T. Scott.
L. weberi, A. Scott.
Ectinosoma melaniceps Boeck.
E. normani T. and A. Scott.
Euterpina acutifrons (Dana).
Harpacticus gracilis Claus.
H. littoralis Sars.
Alteutha interrupta Goodsir.
Parategastes sphæricus Claus.
Tisbe furcata (Baird).
Phyllothalestris mysis Claus.
Dactylopusia thisboides Claus.
D. brevicornis Claus.
Parawestwoodia nobilis (Baird).
Pseudothalestris minuta (Claus).
Diosaccus tenuicornis Claus.
Stenhelia (*Delavalia*) *normani* Scott.
Amphiascus cinctus Claus.
A. phyllopus Sars.
Mesochra pygmæa Claus.
Ameira parvula (Claus).
A. sibogæ A. Scott (= *scotti* Sars).
Laophonte bulbifera Norman.
L. cornuta Philippi.

Chilton (1910, p. 131) has called attention to the possibility of larger Crustacea, such as crabs and amphipods, as well as barnacles, being transported by ships, and he adds: "Naturally, the Crustacea that are suitable for dispersal by means of ships can also be dispersed by floating logs ; in that case, however, they would follow the tracks of the prevailing currents." It seems possible that a means of dispersal of these weed-haunting forms may be found in the drifting masses of seaweed, and especially of such floating weed as *Sargassum*, that are swept along by the great surface currents ; such floating masses of weed might harbour numerous Harpacticids, and though the weed would in course of time undergo death and decomposition, some of the Harpacticids and their free-swimming nauplii would in all probability be able to find other similar floating masses, and any such object as a floating log would rapidly become covered with weed and would form a more or less permanent home. Unfortunately, there are in the literature very few references to the examination of such habitats for the presence of Harpacticid Copepoda ; T. Scott (1912) has, however, recorded the presence in floating weed-masses of the following :

Harpacticus fucicolus T. Scott,
Amphiascus fucicolus T. Scott,
Scutellidium fucicolum (T. Scott) (= *Psamathe fucicola* T. Scott),

and in addition three other species were taken in the tow-net at the surface, namely :

Scutellidium longicaudum Philippi	in 13° 38′ N. ; 25° 09′ W.
Parathalestris clausi Norman	in 4° 15′ S. ; 33° 38′ W.
Diosaccus tenuicornus Claus,	in 23° 08′ S. ; 39° 40′ W.

I have little doubt that an intensive study of the fauna of such floating weed-masses would reveal the presence of other species. A. Scott (1902) has recorded the occurrence of several species of Harpacticids in collections made by attaching a fine-silk tow-net to a tap supplied with sea-water from the ship's pump. These individuals must therefore have been part of the plankton living a few feet below the surface. The species thus obtained were :

Longipedia coronata Claus.
Microsetella norvegica (Boeck).
Euterpina acutifrons (Dana).
Macrosetella gracilis (Dana).
Miracia efferata Dana.
Clytemnestra scutellata Dana.
Harpacticus chelifer Müller.
Alteutha interrupta Goodsir.
Tisbe furcata (Baird).
Dactylopusia thisboides (Claus).
D. vulgaris Sars.
Pseudothalestris minuta (Claus).
Amphiascus erythræus (A. Scott).
A. robinsoni (A. Scott).
Teissierella irrasa (A. Scott).
Stenhelia (*Delavalia*) *minuta* A. Scott.
S. (*D.*) *normani* T. Scott.
Laophonte herdmani (A. Scott) (= *brevirostris* Claus).
L. inornata A. Scott.
L. pygmæa T. Scott.
Cletodes limicola Brady.

In the collections made by the "Siboga" in the Malay Archipelago, the following species were taken in the tow-net either at or near the surface :

Harpacticus clausi A. Scott.
H. cristatus A. Scott.
H. glaber Brady.
Peltidium intermedium A. Scott.
Parapeltidium johnstoni A. Scott.
Phyllothalestris mysis (Claus).
Rhynchothalestris ruficincta (Norman).
Tydemanella typica A. Scott.
Pseudothalestris sarsi A. Scott.
Ameira sibogæ A. Scott.
Phyllopodopsyllus longicaudatus A. Scott.
Cletodes latipes A. Scott.
Metis jusseaumei (Richard).

In the present collections the following were also taken in the tow-net :

Porcellidium fimbriatum Claus.
Tisbe ensifera (Fischer), var. *indica* Sewell.
T. gracilis T. Scott.
Tisbintra nankaurica sp. nov.
Diosaccus truncatus Gurney.
Amphiascus inermis sp. nov.

Admittedly, in most, if not all, of these latter instances the tow-netting was taken in comparatively close proximity to the coast, and the specimens may have been swept away from their usual habitat and carried up to the surface by currents and vortices, but once having been caught up in these surface currents their destination will depend on their ability to survive under these abnormal conditions, and any floating object, especially if covered with weed, would probably serve as a temporary home, their final destination being dependent on the direction of flow of such a current.

In the following pages I have attempted to correlate the distribution of the Indian Harpacticids with the known trends of the surface currents, and it seems to me that we thus get a rational explanation of the wide dispersal of certain of these weed-haunting forms.

I have, for the purpose of this survey assumed that the Harpacticid fauna of the coasts of India and the neighbouring islands, such as the Laccadives and Maldives on the west and the Andamans and Nicobars on the east, is identical with that of the Red Sea and the

Suez Canal ; as is only to be expected, certain species have been recorded from both these regions that have not as yet been taken on the Indian coasts and, *vice versa*, several Indian forms are still unknown from either the Red Sea or the Suez Canal, but of a total of 25 species recorded from the Red Sea, no less than 60 per cent. are also known from Indian waters, and of 68 species obtained in the Suez Canal, 55 per cent. occur on the coasts of India and Ceylon. There can thus be no doubt that there is a close degree of similarity between the faunas of these regions.

The species recorded up to the present time from the northern part of the Indian Ocean and its offshoots are as follows :

Family LONGIPEDIIDÆ.
- Genus *Longipedia* Claus.
    - *Longipedia brevispinosa* Gurney.
    - *L. coronata* Claus.
    - *L. minor* T. Scott.
    - *L. rosea* Sars.
    - *L. scotti* Sars.
    - *L. weberi* A. Scott.
- Genus *Sunaristes* Hesse.
    - *Sunaristes paguri* Hesse.
- Genus *Canuella* T. Scott.
    - Subgenus *Canuella* (s. str.).
        - *Canuella (Canuella) furcigera* Sars.
        - *C. (C.) inopinata* Thompson and A. Scott.
        - *C. (C.) longipes* Thompson and A. Scott.
        - *C. (C.) perplexa* T. Scott.
        - *C. (C.) scotti* nom. nov. (*C. curticauda* A. Scott, *non* Thompson and A. Scott).
    - Subgenus *Ellucana* nov.
        - *Canuella (Ellucana) curticauda* Thompson and A. Scott.
        - *C. (E.) longicauda* sp. nov.
- Genus *Canuellina* Gurney.
    - *Canuellina insignis* Gurney.

Family ECTINOSOMIDÆ.
- Genus *Ectinosoma* Boeck.
    - *Ectinosoma melaniceps* Boeck.
    - *E. normani* T. and A. Scott.
    - *E. propinquum* T. and A. Scott.
- Genus *Microsetella* Brady and Robertson.
    - *Microsetella norvegica* (Boeck).
    - *M. rosea* (Dana).
- Genus *Pseudobradya* Sars.
    - *Pseudobradya similis* T. and A. Scott.

Family TACHIDIIDÆ.
- Genus *Tachidius* Lilljeborg.
    - *Tachidius littoralis* Poppe.
    - *Tachidius* sp. (? *discipes* Giesbrecht).

Genus *Euterpina* Norman.
  Euterpina acutifrons (Dana).

Family Macrosetellidæ.
  Genus *Macrosetella* A. Scott.
    Macrosetella oculata (Sars).
    M. gracilis (Dana).
  Genus *Miracia* Dana.
    Miracia efferata Dana.
    M. minor T. Scott.

Family Clytemnestridæ.
  Genus *Clytemnestra* Dana.
    Clytemnestra rostrata (Brady).
    C. scutellata Dana.

Family Pontostratiotidæ.
  Genus *Ægisthus* Giesbrecht.
    Ægisthus aculeatus Giesbrecht.
    Æ. mucronatus Giesbrecht.

Family Harpacticidæ.
  Genus *Harpacticus* M. Edwards.
    Harpacticus chelifer Müller.
    H. clausi A. Scott.
    H. fucicolus T. Scott.
    H. gracilis Claus.
      ,, var. *orientalis* Sewell.
    H. littoralis Sars.
  Genus *Harpacticella* Sars.
    Harpacticella lacustris Sewell.

Family Peltidiidæ.
  Genus *Peltidium* Philippi.
    Peltidium angulatum Thompson and A. Scott.
    P. elegans Wolfenden.
    P. exiguum A. Scott.
    P. intermedium A. Scott.
    P. minutum A. Scott.
    P. maldivianum sp. nov.
    P. ovale Thompson and A. Scott.
    P. perplexum Thompson and A. Scott.
    P. serratum Thompson and A. Scott.
    P. speciosum Thompson and A. Scott.
  Genus *Alteutha* Baird.
    Alteutha interrupta Goodsir (= *A. bopyroides* A. Scott).
  Genus *Alteuthella* A. Scott.
    Alteuthella spinicauda A. Scott.

Family TEGASTIDÆ.
  Genus *Tegastes* Norman.
    Tegastes minutus sp. nov.
    T. nigrans T. and A. Scott.
  Genus *Parategastes* Sars.
    Parategastes chalmersi Thompson and A. Scott.
    P. sphæricus (Claus).
    ,, var. *similis* Sewell.
  Genus *Syngastes* Monard.
    Syngastes donnani Thompson and A. Scott.
    S. imthurni Thompson and A. Scott.
    S. indicus sp. nov.
    S. twynami Thompson and A. Scott.

Family PORCELLIDIIDÆ.
  Genus *Porcellidium* Claus.
    Porcellidium acuticaudatum Thompson and A. Scott.
    P. brevicaudatum Thompson and A. Scott.
    P. fimbriatum Claus.
    P. ravanæ Thompson and A. Scott.
    P. tuberculatum Wolfenden.

Family IDYÆIDÆ.
  Genus *Tisbe* Lilljeborg.
    Tisbe ensifera (Fischer), var. *indica* Sewell.
    T. furcata (Baird).
    T. gracilis T. Scott.
    T. longicornis (T. Scott).
    T. longisetosa Gurney.
    T. tenera (Sars).
  Genus *Tisbella* Gurney.
    Tisbella timsæ Gurney.
  Genus *Tisbintra* nov.
    Tisbintra nicobarica sp. nov.
  Genus *Paraidya* nov.
    Paraidya major sp. nov.
    P. minor sp. nov.
  Genus *Scutellidium* Claus.
    Scutellidium longicaudum (Philippi).
    S. machairopoides (Monard).
    S. plumosum Brady.

Family THALESTRIDÆ.
  Genus *Phyllothalestris* Sars.
    Phyllothalestris mysis Claus.
    P. orientalis sp. nov.
    P. sarsi sp. nov.

Genus *Rhynchothalestris* Sars.
  Rhynchothalestris rufocincta (Norman).
  R. similis A. Scott.

Genus *Parastenhelia* Thompson and A. Scott.
  Parastenhelia hornelli Thompson and A. Scott.
  P. littoralis (Claus).
    ,, f. *penicillata* Willey.
    ,, f. *scotti* nov.
  P. similis Thompson and A. Scott.
  Parastenhelia sp., Gurney.

Genus *Xouthous* Thomson (= *Megarthrum* Norman and T. Scott).
  Xouthous æmula (Thompson and A. Scott).
  X. laticaudatum Thompson and A. Scott.
  X. maldiviæ sp. nov.
  X. purpurocinctum (Norman and T. Scott).

Genus *Eudactylopus* A. Scott.
  Eudactylopus anomala sp. nov.
  E. fasciata sp. nov.
  E. latipes (T. Scott).
  E. opima (Brian).
  E. striata sp. nov.
  Eudactylopus sp.

Genus *Dactylopusia* Norman.
  Dactylopusia brevicornis (Claus).
  D. falcifera Willey, f. *pallida* Willey.
    ,, ,, f. *violacea* nov.
  D. oculata Gurney.
  D. platysoma Thompson and A. Scott.
  D. thisboides (Claus).
  D. tropica sp. nov.
  D. vulgaris Sars.

Genus *Jalysus* Brian.
  Jalysus investigatoris sp. nov.
  J. proximus sp. nov.
  J. rufus Brian.

Genus *Parawestwoodia* Sharpe.
  Parawestwoodia nobilis (Baird).
  P. purpurea Gurney.

Genus *Pseudothalestris* T. Scott.
  Pseudothalestris imbricata Brady (? = *Westwoodia dubia* Brian).
  P. minuta (Claus) (= *P. major* T. and A. Scott).
  P. nana T. Scott.

Family Diosaccidæ.

Genus *Diosaccus* Boeck.
Diosaccus hamiltoni Thompson and A. Scott.
D. monardi sp. nov.
D. tenuicornis (Claus).
D. truncatus Gurney.

Genus *Amphiascus* Sars.
Amphiascus ægyptius Gurney.
A. angustipes Gurney (= *Minutus* Thompson and A. Scott).
A. brevicornis (Thompson and A. Scott).
A. calcarifer sp. nov.
A. cinctus (Claus).
A. ctenophorus Monard.
A. dentatus (Thompson and A. Scott).
A. dentipes (Thompson and A. Scott).
A. erythræus A. Scott (= *tenax* Brian).
A. gracillicaudata (Thompson and A. Scott).
A. havelocki (Thompson and A. Scott).
A. hirsutus (Thompson and A. Scott).
A. hirtus Gurney.
A. inermis sp. nov.
A. longicornis (Thompson and A. Scott).
A. maldivensis Wolfenden (? = *hirutus* (Thompson and A. Scott)).
A. perplexus (Thompson and A. Scott) (= *sinuatus* Sars).
A. phyllopus (Sars).
A. rebus sp. nov.
A. robinsoni (A. Scott).
A. robustus (Thompson and A. Scott).
A. rostratus Gurney.
A. similis (Claus).
A. typhlops Sars.
A. valens Gurney.

Genus *Teissierella* Brady.
Teissierella adduensis sp. nov.
T. irrasa A. Scott.
T. knoxi (Thompson and A. Scott).
T. propinqua (T. Scott).

Genus *Stenhelia* Boeck.
Subgenus *Delavalia* Brady.
Stenhelia (*Delavalia*) *latisetosa* sp. nov.
S. (*D.*) *longifurca* Sewell.
S. (*D.*) *minuta* A. Scott.
S. (*D.*) *normani* T. Scott (= *S. inopinata* A. Scott).
S. (*D.*) *polluta* Monard.
S. (*D.*) *truncatipes* sp. nov.

Family AMEIRIDÆ.
  Genus *Ameira* Boeck.
    Ameira sibogæ A. Scott (= *A. scotti* Sars).
    A. minor Thompson and A. Scott.
    A. parvula (Claus) (= *A. tau* Giesbrecht).
    A. tenuipes Thompson and A. Scott.
  Genus *Ameiropsis* Sars.
    Ameiropsis robinsoni Gurney.
  Genus *Nitocra* Boeck.
    Nitocra affinis Gurney.
    N. lacustris (Schmank.).
    N. sewelli Gurney.
    N. spinipes Boeck.
      ,, var. *orientalis* Sewell.

Family CANTHOCAMPTIDÆ.
  Genus *Atthyella* Brady.
    Atthyella marina Gurney.
  Genus *Tetragoniceps* Brady.
    Tetragoniceps dubia Thompson and A. Scott
  Genus *Leptomesochra* Sars.
    Leptomesochra nasuta sp. nov.
  Genus *Mesochra* Boeck.
    Mesochra meridionalis Sars.
    M. nana Brady.
    M. pygmæa (Claus).
    M. rostrata Gurney.
    M. timsæ Gurney.
    Mesochra sp.
  Genus *Pseudomesochra* Gurney.
    Pseudomesochra parvula Gurney.
  Genus *Phyllopodopsyllus* T. Scott.
    Phyllopodopsyllus furcifer Sars.
    P. minor (Thompson and A. Scott).

Family LAOPHONTIDÆ.
  Genus *Laophonte* Philippi.
    Laophonte adduensis sp. nov.
    L. armiger Gurney (= *L. hystrix* Brian).
    L. bengalensis Sewell.
    L. brevirostris (Claus).
    L. bulbifera Norman.
    L. chathamensis Sars.
    L. cornuta Philippi.
    L. gurneyi Lang.
    L. hirsuta Thompson and A. Scott.
    L. inornata A. Scott.

L. macani sp. nov.
L. meinerti Brady.
L. mirabilis Gurney
L. oculata Gurney.
L. pygmæa T. Scott.
L. quinquespinosa Sewell.
L. serrata Claus.
L. sima Gurney.
L. strömi (Baird).
L. trispinosa sp. nov.
Genus *Laophontodes* T. Scott.
Laophontodes hamata (Thompson) = (*L. bicornis* A. Scott).
Genus *Cleta* Claus.
Cleta secunda Sewell.

Family CLETODIDÆ.
Genus *Cletodes* Brady.
Cletodes limicola Brady.
Genus *Cletocamptus* Schmank.
Cletocamptus confluens (Schmeil).
C. retrogressus Schmank.
Genus *Laophontella* Thompson and A. Scott.
Laophontella armatus (Willey), var. *indica* nov.
L. typica Thompson and A. Scott.
Genus *Orthopsyllus* Brady.
Orthopsyllus linearis (Claus).
Orthopsyllus sp.
Genus *Limnocletodes* Borutzky.
Limnocletodes secundus Sewell.
Genus *Enhydrosoma* Boeck.
Enhydrosoma nicobarica sp. nov

Family CYLINDROPSYLLIDÆ.
Genus *Horsiella* Gurney.
Horsiella brevicornis (van Douwe).

Family CEYLONIIDÆ.
Genus *Ceyloniella* Wilson.
Ceyloniella armata (Claus).
,, var.
C. nicobarica sp. nov.
,, var.

Family METIDÆ.
Genus *Metis* Philippi.
Metis jusseaumei (Richard).
M. pallida Gurney.

We thus have no less than 202 species from Indian waters, and it is very interesting to try and trace the origin and distribution of this fauna. Thanks to the work of several expeditions* we now have records of 66 species of Harpacticid Copepods from the edge of the Antarctic continent; some of these were taken in the Indian section, and others have been recorded from the Atlantic or Pacific sections, but it is highly probable that all such southern species are circumpolar in their distribution, and for the purposes of this paper I shall assume that this is the case. Of the known Antarctic species, only 6 occur in Indian waters, namely:

Ectinosoma melaniceps Boeck.
Microsetella norvegica (Boeck).
Macrosetella gracilis (Dana).
Harpacticus chelifer Müller.
Dactylopusia thisboides (Claus).
Orthopsyllus linearis (Claus).

Of these six species, two, *Microsetella norvegica* and *Macrosetella gracilis*, are pelagic in their habitat and are of world-wide distribution, the other four are weed-haunting littoral forms. We thus have only four weed-haunting Harpacticids, or 6 per cent. of the Antarctic fauna, that have been able to reach Antarctic waters from the tropical and sub-tropical waters of one or other of the great oceans, and we do not know of a single species that has been able to traverse the opposite route and invade the tropical waters of the Indian Ocean, though three or four appear to have been able to penetrate as far northward as the Island of Kerguelen or the neighbouring islands of Herd and St. Paul, namely:

Harpacticus pulvinatus Brady (= *H. pirei* T. Scott),
Idomene australis Brady,
Amphiascus glacialis Brady, and perhaps
Tisbe tenuimana Giesbrecht,

but this last appears to be doubtful, for the form described by Brady from Kerguelen and the Cape of Good Hope under this name seems to me to be different from that originally described from the Antarctic by Giesbrecht and much more nearly resembles *Tisbe tenera* (Sars), in which case it is probably an immigrant from the tropical region. On the other hand, a few species of weed-haunting littoral forms, as opposed to pelagic forms, have succeeded in reaching Kerguelen or the neighbouring islands of St. Paul or Herd, from the tropical waters, namely:

Harpacticus gracilis Claus,
Thalestris harpacticoides Claus,
Pseudothalestris imbricata Brady,
Amphiascus minutus Claus,
Laophonte cornuta Philippi,
Zaus spinatus Goodsir,

and it is probable that to these two others should be added, namely, *Rhynchothalestris rufocincta* (Norman), described by Brady (1910, p. 532, fig. xxiii) under the name *R. vanhöffeni*, and *Tisbe tenera* Sars, attributed by Brady to *T. tenuimana* Giesbrecht, making 8 in all. I have been able to collate records of 35 species from this area, and thus the Indian element in the fauna amounts to 23 per cent.

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* Brady, 1883 and 1910. Farran, 1929. Giesbrecht, 1902. Quidor, 1920. T. Scott, 1912.

Very similar conditions appear to exist in the South-west Pacific Ocean. Lang (1934) has recorded the presence of 23 species of littoral Harpacticids from the coast of Campbell Island in lat. 52° 30′ S., and of these, only three are truly antarctic species, namely :

Harpacticus pulvinatus Brady,
Tigriopus angulatus Lang (= *Harpacticus brevicornis* Giesbrecht),
Parawestwoodia assimilis Sars, var. *antarctica* T. Scott,

while one Antarctic genus, *Perissocope* Brady, is represented by a second species, *P. litoralis* Lang.

The geographical distribution of the pelagic Calanoid Copepoda in this southern region has been discussed by Giesbrecht (1902) and Wolfenden (1908 and 1911). Wolfenden has shown that immediately to the north of the island of New Amsterdam the character of the fauna changes, so that there clearly is some boundary in this region across which the Antarctic fauna cannot pass and similarly the sub-tropical Indian fauna cannot penetrate. " North of Kerguelen, *i. e.*, 50° S. lat., no Antarctic species appear to extend, while the typically sub-tropical species of the Indian Ocean extend as far south as latitude 30° S., where their southern extension appears to be arrested."

Similarly, as regards the Atlantic section of the Southern Ocean, Wolfenden remarks : " While the same collections indicate that the Antarctic species extend northwards into the Atlantic Ocean in gradually diminishing numbers, only as far as lat. 40° S., north of which they do not occur, a few typically Atlantic deep-water species find their way into the Antarctic Sea."

It thus seems clear that there is some natural feature that is preventing the northern extension of the truly Antarctic species of both Calanoid and Harpacticid Copepoda northward as far as Kerguelen or Campbell Islands, and it seems probable that this is the Sub-polar Convergence line, where the Polar Stream and the West-wind Drift meet ; reference to Schott (1935, pl. xxix) shows that this Convergence Line runs from about lat. 52° S. in the longitude of South Africa and, as it passes eastward, trends further southward, so that in the neighbourhood of Kerguelen it lies in lat. 50° S., immediately to the south of this island, and in the longitude of Campbell Island at about lat. 55° S. Similarly, the barrier to the southward extension of the tropical and sub-tropical forms is to be sought in the Sub-tropical Convergence Line, along which the sub-tropical waters meet the waters of the West-wind Drift.

Our knowledge of the Harpacticid fauna of the western and south-western region of the tropical and sub-tropical zone of the Pacific Ocean, in which I include the area of the Malay Archipelago, is still far from complete ; but I have been able to collate references* to the occurrence in that region of 74 species, of which 45 have been taken in Indian waters, namely :

Longipedia coronata Claus.
L. scotti Sars.
L. weberi A. Scott.
Sunaristes paguri Hesse.
Canuella scotti mihi (= *C. curticauda* A. Scott).
Ectinosoma melaniceps Boeck.

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* Brady, G. S., 1883 and 1899. Cleve, P. T., 1901. Lang, K., 1934. Sars, G. O., 1905. Scott, A., 1909. Thomson, G. M., 1882.

Euterpina acutifrons (Dana).
Microsetella norvegica (Boeck).
M. rosea (Dana).
Miracia efferata Dana.
Macrosetella gracilis (Dana).
Clytemnestra scutellata Dana.
C. rostrata (Brady).
Harpacticus chelifer Müller.
H. clausi A. Scott.
Peltidium exigium A. Scott.
P. intermedium A. Scott.
P. minutum A. Scott.
Porcellidium brevicaudatum Thompson and A. Scott.
Tisbe furcata (Baird).
Scutellidium plumosum Brady.
S. longicaudum Philippi (= *S. thisboides, Psamathe longicauda*).
Rhynchothalestris rufocincta (Norman).
,, *similis* A. Scott.
Parastenhelia littoralis Sars (= *P. forficula*, var. *littoralis*).
Xouthous laticaudata (Thompson and A. Scott) (= *Idomene laticaudatum*).
Eudactylopus latipes (T. Scott).
Dactylopusia thisboides (Claus).
Amphiascus cinctus (Claus).
A. havelocki (Thompson and A. Scott).
A. hirsutus (Thompson and A. Scott).
A. hirtus Gurney.
Ameira sibogæ A. Scott (= *A. scotti* Sars, nom. nov. for *tenuicornis*).
Mesochra meridionalis Sars.
Laophonte chathamensis Sars.
L. cornuta Philippi (= *L. australasica* Thomson).
L. hirsuta Thompson and A. Scott.
L. meinerti Brady.
L. serrata Claus.
Laophontodes hamatus (Thomson).
Orthopsyllus linearis (Claus).
Ceyloniella armata (Claus).
Metis jusseaumei (Richard) (= *Ilyopsyllus affinis* T. Scott).
Ægisthus aculeatus Giesbrecht.
Æ. mucronatus Giesbrecht.

The truly pelagic species, belonging to the genera *Euterpina*, *Macrosetella*, *Clytemnestra*, *Ægisthus* and *Miracia*, are all common to both regions; and of the 64 weed-haunting littoral species, no less than 36, or 56 per cent., are now known to occur in both the Indian and Pacific areas. In the Malay Archipelago itself the proportion is considerably higher, for out of a total of 44 species of Harpacticids obtained by the "Siboga" Expedition, no less than 30, or 68 per cent., have been taken in Indian waters. There is clearly a very close connection between the two regions, as is only to be expected from the very numerous channels between the various islands of the Malay Archipelago that connect the two regions directly, and the Straits of Malacca that connect the Pacific region with the Bay of Bengal through the Andaman Sea ; furthermore, in these channels the surface currents are reversed, in consequence of the alternation of the North-east and South-west monsoons, every six months.

Of the above species that have been found in both Pacific and Indian waters, a certain number have, up to the present time, not been recorded from further west, namely :

Canuella scotti mihi.
Harpacticus clausi A. Scott.
Peltidium exiguum A. Scott.
P. intermedium A. Scott.
P. minutum A. Scott.
Porcellidium brevicaudatum (Thompson and A. Scott).
Scutellidium plumosum Brady.
Mesochra meridionalis Sars.
Laophonte chathamensis Sars.
L. meinerti Brady.

But the great majority have now been recorded from one or several regions still further westward, such as the Atlantic Ocean, the Mediterranean Sea, or even further still such as the North Sea and the coast of Norway.

In contrast to this, no less than 158 species, now known to occur in Indian waters, have not as yet been recorded from the Malay Archipelago or the Pacific Ocean ; further collecting in these regions will doubtless reveal the presence of some of these species, but it seems probable that there has been an evolution of many new forms in Indian waters. In other groups of the animal kingdom the Malay Archipelago and the south-western part of the Pacific have been recognized as the ancestral home of many new species and genera, and that a similar process of evolution is going on in the Harpacticids of the Indian Ocean, and especially in the tropical and subtropical areas, seems to be indicated by the discovery in these waters of a number of species and of several genera and subgenera that are, as yet, unknown outside the limits of the region. Of genera, five are known only from Indian waters, namely :

Canuellina Gurney.
Tisbintra gen. nov.
Paraidya gen. nov.
Pseudomesochra Gurney.
Syngastes Monard.

Two other genera, namely, *Tisbella* Gurney and *Jalysus* Brian, are known from Indian waters and only one other area ; and the genus *Eudactylopus* A. Scott also appears to have had its home in Indian waters, where it is represented by no less than five species, of which one, *Eudactylopus latipes* (T. Scott), has managed to reach both the Malay Archipelago and the Gulf of Guinea, and another, *Eudactylopus opima* (Brian), has reached the Mediterranean Sea, where a further species, *E. spectabilis* Brian, has evolved. As regards individual species, no less than 72 out of the total number of 202, or 35 per cent., are known only from Indian waters ; some, and possibly many, will in the future be found in other regions, but the evidence certainly suggests that a number of species have originated in these waters and up to the present time have been unable to extend their distribution westward.

As opposed to this, no less than 81 species, or 40 per cent., are now known from regions lying to the west. The only possible routes by which such species can have been dispersed are either by (i) active migration, as suggested by Gurney, along the coastal regions of South Africa and round the Cape of Good Hope into the southern Atlantic Ocean, or through the Suez Canal into the Mediterranean Sea since this canal was cut ; or (ii) passive transference either directly by means of ocean currents or indirectly by floating logs or other objects, such as masses of floating weed, in which case the direction of dispersal can only have been along the direction of flow of the currents, or on ship's bottoms along past or present trade routes.

We are at present almost completely ignorant of the Harpacticid fauna of the region of the Cape of Good Hope, and the nearest region of the Atlantic Ocean in which any systematic investigations have been carried out is the Gulf of Guinea.*

From this area T. Scott has recorded the following species :

***Longipedia minor* T. Scott.
Ectinosoma crystalli T. Scott.
**Microsetella norvegica* (Boeck) (= *Microsetella atlantica* Brady and Robertson).
Bradya brevicornis T. Scott.
**Euterpina acutifrons* (Dana) (= *Euterpe gracilis* Claus, var. *armata* T. Scott).
Tegastes andrewi (T. Scott).
**Clytemnestra rostrata* (Brady).
**Ægisthus mucronatus* Giesbrecht (= *A. longirostris* T. Scott.)
**Macrosetella gracilis* (Dana).
**Harpacticus chelifer* Müller, ? var.
**Miracia efferata* Dana.
**M. minor* T. Scott.
**Eudactylopus latipes* (T. Scott) (= *Dactylopus latipes* T. Scott).
**Parastenhelia littoralis* (Claus) (= *Thalestris forficula*, T. Scott, *non* Claus).
Machairopus idyoides Brady.
Stenhelia accraensis T. Scott (? = *Amphiascus typhlops* Sars).
Laophonte brevicornis T. Scott.
**L. cornuta* Philippi (as *L. serrata* (Claus)).
L. longipes T. Scott.
**L. pygmœa* T. Scott.
**Orthopsyllus linearis* (Claus) (= *Cletodes linearis* Claus).
**Metis jusseaumei* (Richard) (= *Ilyopsyllus affinis* T. Scott).
**Teissierella propinqua* (T. Scott) (= *Dactylopus propinquus* T. Scott).

All those marked with an * have been taken in Indian waters. Thus, out of 23 species, no less than 16, or 70 per cent., are common to the two regions. In addition to these species *Machairopus idyoides* Brady has been taken at Kerguelen. There can thus be little doubt of the very close affinity of the Harpacticid fauna of the Gulf of Guinea and that of the tropical and sub-tropical parts of the Indian Ocean. To the south of the Cape of Good Hope there is a complicated mixing of the surface currents, as has been pointed out by Meisenheimer and Gerhardt Schott; it seems to be certain that some of the water of the Agulhas Current does pass westward round the Cape of Good Hope, and in consequence planktonic animals and larvæ may be swept round to the west side and, if able to withstand the change of temperature occasioned by the meeting of the Benguela Current, will ultimately be carried into the warm waters of the South Atlantic Equatorial Current; Stubbings (1936, p. 53) has reviewed this possibility in a previous report, and there is no necessity for me to recapitulate the matter here. It must also be recognized that active migration of the Harpacticid fauna around the coasts of South Africa may also be an important factor in the spread of the Indian fauna westwards into the South Atlantic.

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* T. Scott, 1894.

The only other possible route for the westward migration of the Indian fauna is through the Suez Canal into the Mediterranean Sea; at the same time we must recognize that littoral species may have migrated from the west coast of Africa through the Straits of Gibraltar into the western basin of the Mediterranean Sea, and entry into this region will be assisted by the inflowing surface current (_vide_ Schott, 1926, p. 175), though their dispersal from the Gulf of Guinea to the entrance of the Mediterranean will be opposed by the direction of flow of the Canary Current and the Guinea Current, that set from north to south along this stretch of the African coast.

Our knowledge of the Harpacticid fauna of the western area of the Mediterranean Sea* is now extensive, owing to the researches of Giesbrecht, Claus, Monard and others.

In this region the following 51 Indian species have now been recorded:

*_Longipedia coronata_ Claus.
L. minor T. Scott.
*_L. weberi_ A. Scott.
Canuella furcigera Sars.
*_C. perplexa_ T. Scott.
*_Ectinosoma melaniceps_ Boeck.
*_E. normani_ T. and A. Scott.
*_Euterpina acutifrons_ (Dana).
*_Microsetella rosea_ (Dana).
*_Macrosetella gracilis_ (Dana).
*_Clytemnestra rostrata_ (Brady).
*_Harpacticus chelifer_ Müller.
*_H. gracilis_ Claus.
*_H. littoralis_ Sars.
*_Alteutha interrupta_ Goodsir.
*_Parategastes sphæricus_ (Claus).
*_Porcellidium fimbriatum_ Claus.
*_Tisbe furcata_ (Baird).
T. gracilis T. Scott.
*_T. longicornis_ (T. Scott).
*_Scutellidium longicaudum_ (Philippi).
S. machairopoides (Monard).
*_Phyllothalestris mysis_ Claus.
*_Rhynchothalestris rufocincta_ (Norman).
*_Parastenhelia littoralis_ (Claus).
Dactylopusia brevicornis (Claus).
*_D. thisboides_ (Claus).
*_Parawestwoodia nobilis_ (Baird).
*_Pseudothalestris minuta_ (Claus).
*_Diosaccus tenuicornis_ (Claus).
Amphiascus ægyptius Gurney.
*_A. cinctus_ (Claus).
A. ctenophorus Monard.
*_A. erythræus_ A. Scott.
A. hirsutus (Thompson and A. Scott).
*_A. phyllopus_ (Sars).
*_A. similis_ (Claus).
*_Teissierella knoxi_ (Thompson and A. Scott).
*_Stenhelia (Delavalia) normani_ T. Scott.
S. (D.) polluta Monard.
*_Ameira parvula_ (Claus).
A. sibogæ A. Scott.
*_Mesochra pygmæa_ (Claus).
*_Laophonte brevirostris_ (Claus).
L. bulbifera Norman.
*_L. cornuta_ Philippi.
*_L. strömi_ (Baird).
Laophontodes hamata (Thomson).
Cletodes limicola Brady.
*_Ceyloniella armata_ (Claus).
Metis jusseaumei (Richard).

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* Claus, 1866. Giesbrecht, 1892. Lang, 1935. Monard, 1926, 1928_a_, 1937.

The total number of Harpacticids hitherto recorded from this region, so far as I have been able to ascertain, is 169, so that the percentage of Indian forms is 30 per cent. The fauna of the eastern part of the Mediterranean, including the Adriatic, is not so well known, and the total number of species recorded up to the present from this area is 112.* As one would expect, many of the Indian forms found in this eastern region are the same as those in the western area ; these are indicated by an asterisk in the preceding list, and in addition, the following Indian species have been recorded :

Longipedia rosea Sars.
Microsetella norvegica (Boeck).
Clytemnestra scutellata Dana.
Tisbe ensifera (Fischer).
Eudactylopus opima (Brian).
Jalysus rufus Brian.
Nitocra spinipes Boeck.
Laophonte armiger Gurney.
Orthopsyllus linearis (Claus), and perhaps also—
Pseudothalestris imbricata (Brady) (? = *Westwoodia dubia* Brian).

We thus have records of no less than 45 (or 46) Indian species out of a total of 112, or 40 per cent.

Brian (1928*b*, p. 295) has pointed out that 10 or 11 species found by him in the Dodecanese are cosmopolitan, and in his view these have migrated into the Mediterranean Sea from the Atlantic Ocean, and have made their way from this area through the Suez Canal into the Red Sea and the Indian Ocean. He cites the following—

Tisbe furcata (Baird),
Rhynchothalestris rufocincta (Norman),
Dactylopusia thisboides (Claus),
Amphiascus cinctus (Claus),
Laophonte cornuta Philippi,

as species that have made their way from the Ægean Sea into the Red Sea, and

Longipedia coronata Claus,
Microsetella norvegica (Boeck),
Porcellidium fimbriatum Claus,
Phyllothalestris mysis Claus,
Ceyloniella armata (Claus),

as species that have migrated even further afield to the Indian Ocean.

That numerous species may have entered the Mediterranean Sea from the Atlantic Ocean there can be little doubt, and some may have passed through the Suez canal from north to south either by active migration or else by being carried on ships' bottoms ; but it seems more probable that many species have traversed the canal in the opposite direction and have passed from the Red Sea into the Mediterranean. As Munro Fox (1929, p. 846) has pointed out, by far the greater number of marine organisms living in the Suez Canal have entered from the Red Sea, and " the effect of the currents on the fauna must be to transport all planktonic organisms from south to north during the ten months of October to July, and in the opposite direction in August and September ". That migration from the Red Sea through the Suez Canal into the Mediterranean Sea has occurred in recent times appears to be clearly indicated in the case of *Eudactylopus opima* (Brian) and *Jalysus rufus* Brian, as I have pointed out (*vide* p. 367), and it seems highly probable that certain other species have followed the same route, such as *Laophonte armiger* Gurney (= *L. hystrix* Brian), *Ceyloniella armata* (Claus) and *Pseudothalestris imbricata* Brady, while yet others have reached the western basin, though up to now they have not been reported from the eastern end, namely :

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* Brian, 1928, 1928*a*. Jakubisiak, 1933. Pesta, 1920.

Stenhelia polluta Monard.
Scutellidium machairopoides (Monard).
Amphiascus ægyptius Gurney.
A. ctenophorus Monard.
Teissierella knoxi (Thompson and A. Scott).

Up to now we have been considering those regions, dispersal to which may possibly have been effected by active migration around the continental margins ; but such a method cannot have been utilized for the spread of species across the Atlantic Ocean. Willey (1930, 1931 and 1935) has investigated the Harpacticid fauna of Bermuda, and has recorded the presence in those waters of 61 species of weed-haunting forms, among which the following are now known to occur in Indian waters :

Tisbe ensifera Fischer.
T. gracilis (T. Scott).
Tisbella timsæ Gurney.
Parastenhelia littoralis Sars.
Rhynchothalestris rufocincta (Norman).
Dactylopusia brevicornis (Claus).
D. falcifera Willey.
D. thisboides (Claus).
Parawestwoodia purpurea Gurney.
Amphiascus cinctus (Claus).
A. erythræus (A. Scott).
A. hirsutus (Thompson and A. Scott).
A. phyllopus Sars.
A. robinsoni (A. Scott).
A. rostratus Gurney.
Teissierella knoxi (Thompson and A. Scott).
T. propinqua (T. Scott).
Stenhelia (*Delavalia*) *normani* (T. Scott).
Pseudomesochra parvula Gurney.
Ameira parvula (Claus).
A. sibogæ A. Scott.
Nitocra affinis Gurney.
N. lacustris (Schmank.).
Laophonte armiger Gurney.
L. brevirostris (Claus).
L. bulbifera Norman.
L. cornuta Philippi.
Laophontella armata (Willey).
Phyllopodopsyllus minor (Thompson and A. Scott).
Ceyloniella armata (Claus).

Thus, no less than 30 species, representing 50 per cent. of the total, are common to both India and Bermuda. That there is a close connection between the fauna of the Arabian Sea and of the western part of the North Atlantic Ocean has long been recognized, especially as regards the fauna of the deeper waters, and in order to account for the presence of species in these two areas and nowhere else it has usually been suggested that they represent the last traces of the fauna that originally inhabited the Tethys Sea in Tertiary times, and that when the uplift of the Alpine-Himalayan mountain system obliterated the eastern part of this sea and thus separated the North American and Indian regions, a number of species still managed to survive in the two, now widely separated, areas. Were this the true explanation one would expect to find that a large proportion, if not all, of these littoral-haunting Harpacticids, common to the two areas, would also occur in the Mediterranean Sea; but a comparison of the lists of species common to India and the Mediterranean Sea with that of the Bermudan species reveals that no less than 13 Indian species are present in Bermuda but have not as yet been recorded from the Mediterranean Sea, namely:

Tisbe ensifera Fischer.
Tisbella timsæ Gurney.
Parawestwoodia purpurea Gurney.
Dactylopusia falcifera Willey.
Amphiascus erythræus (A. Scott).
A. robinsoni (A. Scott).
A. rostratus Gurney.
Teissierella propinqua (T. Scott).
Nitocra affinis Gurney.
N. lacustris (Schmank.).
Pseudomesochra parvula Gurney.
Laophontella armata (Willey).
Phyllopodopsyllus minor (Thompson and A. Scott).

It would thus appear that some other route of dispersal must have been involved, and the one that seems most probable is the flow of the South Atlantic Equatorial Current; we have seen that there is a close connection between the Indian fauna and that of the coast of West Africa, and this current and its continuation in the Gulf Stream and the North Atlantic Drift might well account for the occurrence of many Indian forms in Bermuda.

The fauna of the North American coast of Massachusetts has been investigated to some considerable extent* and we now have records of the occurrence in this region of 87 species, among which the following are known to occur in Indian waters:

Planktonic species:
    Macrosetella gracilis (Dana).
    M. oculata Sars.
    Ectinosoma normani T. and A. Scott.
    Microsetella norvegica (Dana).
    M. rosea (Dana).
    Miracia efferata Dana.
    Clytemnestra rostrata (Brady).
    Ægisthus mucronatus Giesbrecht.
Littoral species:
    Longipedia coronata Claus.
    Canuella furcigera Sars.
    Harpacticus chelifer Müller.
    H. gracilis Claus.
    H. littoralis Sars.
    Parategastes sphæricus (Claus).
    Tisbe furcata (Baird).
Littoral species (cont.):
    T. longicornis T. and A. Scott.
    Parastenhelia littoralis (Sars).
    Dactylopusia brevicornis (Claus).
    D. tisboides (Claus).
    Parawestwoodia nobilis (Baird).
    Pseudothalestris minuta (Claus).
    Diosaccus tenuicornis (Claus).
    Amphiascus cinctus (Claus).
    A. perplexus (Thompson and A. Scott) (= *A. sinuatus* Sars).
    Nitocra spinipes Boeck.
    Ameira parvula (Claus).
    Laophonte cornuta Philippi.
    L. strömi (Baird).
    Tachidius littoralis Poppe.
    Metis jusseaumei (Richard).

We thus have in this area out of a total of 87 species no less than 30 that are known from Indian waters, a percentage of 34 per cent.; but of these 30 species, 8 belong to genera that are pelagic in habitat and so are distributed more or less universally. Of the true littoral weed-haunting forms we have 22 species out of 76, or 29 per cent., but little more than half the percentage found in Bermuda. It thus seems clear that there is a strong connection between the Indian and the Northern West Atlantic regions, and this is clearly borne out by the fact that of the 23 species known from the intermediate region of the Gulf of Guinea, 11, or 48 per cent., occur in the north-west Atlantic. At the same time there is clearly some factor that has caused a distinct falling off in the number of Indian species between Bermuda and the Massachusetts coast; the explanation of this change is, I think, to be found in the cold water of the Labrador current that passes southwards along this section of the American coast between the land and the warm waters of the Gulf Stream, and serves as a barrier to the invasion of many of the warm-water forms, only the more resistant species being able to survive the passage across this stream and continue to exist in the colder conditions.

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* Sharpe, 1910. Wilson, 1932*a*, 1932*b*.

Turning now to the eastern side of the North Atlantic Ocean, Gurney (1927*c*, p. 453) has remarked, " the very large proportion of European species from these distant (Indian and Malayan) seas is a very striking fact ". If, as I believe, these littoral weed-haunting forms can be and are transported by the great oceanic currents, we should expect to find representatives of the Indian fauna present, though in gradually diminishing numbers, on the British coasts, the coasts of the English channel and the Norwegian coasts, and even further northward.

For the coasts of the British Isles* I have been able to collate references to 284 species; doubtless some of these are synonyms, but I think we may accept this figure as approximately correct. Among these species the following Indian forms have been recorded:

Longipedia coronata Claus.
L. minor T. Scott.
L. scotti Sars.
Sunaristes paguri Hesse.
Canuella perplexa T. Scott.
Ectinosoma melaniceps Boeck.
E. normani T. and A. Scott.
E. propinquum T. and A. Scott.
Pseudobradya similis (T. and A. Scott).
Euterpina acutifrons (Dana).
Microsetella norvegica (Boeck).
M. rosea (Dana).
Clytemnestra rostrata (Brady).
Harpacticus chelifer Müller.
H. gracilis Claus.
H. littoralis Sars.
Alteutha interrupta (Goodsir).
Parategastes sphæricus (Claus).
Porcellidium fimbriatum Claus.
Scutellidium longicaudum Philippi.
Tisbe furcata (Baird).
T. gracilis T. Scott.
T. longicornis (T. Scott).
T. tenera (Sars).
Phyllothalestris mysis Claus.
Rhynchothalestris rufocincta (Norman).
Parastenhelia littoralis (Claus).
Dactylopusia brevicornis (Claus).
D. tisboides (Claus).
D. vulgaris Sars.
Parawestwoodia nobilis (Baird).
Pseudothalestris minuta (Claus).
Diosaccus tenuicornis (Claus).
Amphiascus cinctus (Claus).
A. phyllopus Sars.
A. similis (Claus).

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* Brady, 1880, 1905. Farran, 1913. Nicholls, 1935, 1939. Norman and T. Scott, 1906. Norman, 1911. Pearson, 1905. Plymouth Marine Fauna, 1931. Scott, T., 1893, 1894, 1905*b*. Scott, T. and A., 1893, 1894, 1895*a*, 1895*b*, 1896. Thompson, I. C., 1893. Thompson, I. C., and Scott, A., 1900.

Stenhelia (Delavalia) normani T. Scott.
Xouthous purpurocinctum (Norman and T. Scott).
Ameira parvula (Claus).
Nitocra spinipes Boeck.
Mesochra pygmæa (Claus).
Laophonte brevirostris (Claus).
L. bulbifera Norman.
L. cornuta Philippi.
L. inornata A. Scott.
L. serrata Claus.
L. strömi (Baird).
Laophontodes hamatus (Thomson).
Cletodes limicola Brady.
Tachidius littoralis Poppe.
? *T. discipes* Giesbrecht.
Orthopsyllus linearis (Claus).
Horsiella brevicornis (van Douwe).

We thus have no less than 53 Indian species out of a total of some 284, or 19 per cent.

The percentage of Indian forms in different parts of the British Isles differs very considerably. Out of a total of 107 species recorded in the Clare Island Survey no less than 37, or 35 per cent., are Indian. The ' Plymouth Marine Fauna ' records the presence in that region of 120 species, of which again 37 are Indian, the percentage thus being 31 ; while out of 139 species recorded from the coasts of Devon and Cornwall, 32, or 23 per cent., are Indian. In contrast to these figures the number of species that has been recorded from the Firth of Forth is 93, and of these only 17, or 18 per cent., are known to occur in Indian waters.

From the neighbouring region of the coast of Brittany* some 158 species of Harpacticids are now known, and among these, 44 are Indian, or 28 per cent. In comparing the lists of Indian species in these two last regions, I find that the following have not as yet been recorded from the Brittany coast :

Longipedia scotti Sars.
Pseudobradya similis Sars.
Ectinosoma propinquum T. and A. Scott.
Microsetella norvegica (Boeck).
M. rosea (Dana).
Clytemnestra rostrata (Brady).
Phyllothalestris mysis Claus.
Stenhelia (Delavalia) normani T. Scott.
Xouthous purpurocinctum (Norman and T. Scott).
Laophonte bulbifera Norman.
Cletodes limicola Brady.
Orthopsyllus linearis (Claus).
Horsiella brevicornis (van Douwe).

But I have little doubt that in the future such forms as belong to the genera *Microsetella* and *Clytemnestra*, which are pelagic in habitat, will eventually be obtained, although their presence in this area must, to some extent, depend on the influx of Atlantic water into the English Channel, and the work of Russell and others has shown that this has been of small extent during recent years. On the other hand, certain species have been recorded from the Brittany coast that have not, as yet, been taken round the British Isles, namely :

*_Longipedia weberi_ A. Scott.
*_Canuella furcigera_ Sars.
Amphiascus perplexus Thompson and A. Scott.
*_Amphiascus erythræus_ A. Scott.
*_Ameira sibogæ_ A. Scott.
*_Scutellidium machairopoides_ (Monard).

It is extremely interesting to note that of the above six species no less than five, indicated by an asterisk, have been recorded from the Mediterranean Sea, and it thus seems possible that these species may have migrated from the Mediterranean Sea to the Brittany coast along the continental margin.

* Canu, 1892. Jakubisiak, 1933. Monard, 1935.

To the east of the British Isles in the North Sea and on the north-west coast of Germany investigations have resulted in the collection of 69 species,[*] among which the following occur in Indian waters :

Longipedia coronata Claus.
L. minor T. Scott.
Canuella perplexa T. Scott.
Ectinosoma melaniceps Boeck.
E. normani T. and A. Scott.
Tachidius littoralis Poppe.
Euterpina acutifrons (Dana).
Harpacticus chelifer Müller.
H. gracilis Claus.
H. littoralis Sars.
Alteutha interrupta Goodsir.
Tisbe furcata (Baird).
T. gracilis T. Scott.
Parawestwoodia nobilis (Baird).
Ameira parvula (Claus).
Nitocra spinipes Boeck.
Mesochra pygmæa (Claus).
Laophonte serrata Claus.
Parategastes sphæricus (Claus).

The percentage of Indian forms is thus 28 per cent.

Further to the west, in the Sub-Arctic region, namely off the south-east coast of Greenland,[†] out of a total of 27 species the following occur in Indian waters :

Canuella furcigera Sars.
Microsetella norvegica (Boeck).
Harpacticus chelifer (Müller).
H. gracilis Claus.
Tisbe furcata (Baird).
T. gracilis (T. Scott).
Rhynchothalestris rufocincta (Norman).
Dactylopusia vulgaris Sars.
Laophonte strömi (Baird).

The percentage of Indian forms in this region is thus as high as 33, or approximately the same as on the west coast of Ireland.

Thanks to the work of G. O. Sars (1903–11, 1921) we now possess an extensive knowledge of the Harpacticid fauna of the Norwegian coasts, and he has recorded the occurrence in that area of some 350 species. Among these the following 53 are now known to be present in Indian waters :

Longipedia coronata Claus.
L. minor T. Scott.
L. rosea Sars.
L. scotti Sars.
Sunaristes paguri Hesse.
Canuella furcigera Sars.
C. perplexa Scott.
Ectinosoma melaniceps Boeck.
E. normani T. and A. Scott.
E. propinquum T. and A. Scott.
Pseudobradya similis Sars.
Microsetella norvegica (Boeck).
Euterpina acutifrons (Dana).
Tachidius discipes Giesbrecht (= *brevicornis* Sars).
Harpacticus chelifer Müller.
? *H. gracilis* Claus.
H. littoralis Sars.
Clytemnestra scutellata Dana.
Alteutha interrupta (Goodsir).
Parategastes sphæricus (Claus).
Porcellidium fimbriatum Claus.
Tisbe ensifera (Fischer).
T. furcata (Baird).
T. gracilis (T. Scott).
T. longicornis (T. Scott).
T. tenera (Sars).
Scutellidium longicaudum Philippi.
Phyllothalestris mysis (Claus).
Rhynchothalestris rufocincta (Norman).

[*] Claus, 1863. Klie, 1913, 1927. Timm, 1894.

[†] Jespersen, P., 1939.

Parastenhelia littoralis (Claus).
Dactylopusia brevicornis (Claus).
D. thisboides (Claus).
D. vulgaris Sars.
Parawestwoodia nobilis (Baird).
Pseudothalestris minuta (Claus).
Diosaccus tenuicornis (Claus).
Amphiascus cinctus (Claus).
A. perplexus Thompson and A. Scott.
A. phyllopus (Sars).
A. similis (Claus).
A. typhlops Sars.
Stenhelia (*Delavalia*) *normani* T. Scott.
Ameira parvula (Claus).
A. sibogæ A. Scott.
Nitocra spinipes Boeck.
Phyllopodopsyllus furcifer Sars.
Laophonte brevirostris (Claus).
L. cornuta Philippi.
L. serrata Claus.
L. strömi (Baird).
Laophontodes hamatus (Thomson).
Orthopsyllus linearis (Claus).
Cletodes limicola Brady.

The proportion of Indian forms in the Norwegian fauna is thus 15 per cent.

As we pass further towards the north to the region of Spitzbergen, Nova Zembla and Franz-Josef Land we still find a number of Indian species present, 20 in all, namely :

Ectinosoma melaniceps Boeck.
E. normani T. and A. Scott.
E. propinquum T. and A. Scott.
Microsetella norvegica (Boeck).
Macrosetella gracilis (Dana).
Harpacticus chelifer Müller.
Parategastes sphæricus (Claus).
Porcellidium fimbriatum Claus.
Tisbe ensifera (Fischer).
T. furcata (Baird).
T. gracilis T. Scott.
Scutellidium longicaudum (Philippi).
Dactylopusia brevicornis (Claus).
D. thisboides (Claus).
Parawestwoodia nobilis (Baird).
Amphiascus typhlops Sars.
Ameira parvula (Claus).
Mesochra pygmæa (Claus).
Laophonte serrata Claus.
Orthopsyllus linearis (Claus).

The total number of species hitherto recorded from this Arctic region* that I have been able to collate is 105, so that the percentage of Indian species appears to be 19.

At first sight it thus appears as if there were proportionately more Indian forms in the Arctic region than in the Norwegian area, but a comparison of the actual lists of Indian species taken in both regions clearly shows that a large number of Indian species that have managed to reach Norway have not, apparently, succeeded in penetrating further to the north.

Longipedia coronata Claus,
L. minor T. Scott,
L. rosea Sars,
L. scotti Sars,
Sunaristes paguri Hesse,
Canuella furcigera Sars,
C. perplexa T. Scott,
Ectinosoma propinquum T. and A. Scott,
Pseudobradya similis Sars,
Euterpina acutifrons (Dana),
Harpacticus gracilis Claus,
H. littoralis Sars,
Clytemnestra scutellata Dana,
Tachidius discipes Giesbrecht,
Alteutha interrupta Goodsir,
Tisbe longicornis (T. Scott),
T. tenera Sars,
Phyllothalestris mysis Claus,
Rhynchothalestris rufocincta (Norman),
Parastenhelia littoralis (Claus),
Pseudothalestris minuta (Claus),
Diosaccus tenuicornis (Claus),

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* Sars, 1909. Scott, T., 1899. Scott, T. and A., 1901, Smirnow, S. S., 1932.

Amphiascus perplexus (Thompson and A. Scott),
A. phyllopus (Sars),
A. similis (Claus),
Stenhelia (*Delavalia*) *normani* T. Scott,
Nitocra spinipes Boeck,
Ameira sibogæ A. Scott,
Phyllopodopsyllus furcifer Sars,
Laophonte brevirostris (Claus),
L. cornuta Philippi,
L. strömi (Baird).
Laophontodes hamatus (Thomson),
Cletodes limicola Brady,

have all disappeared from the faunal lists of this northern area and appear, according to the present state of our knowledge, to be unable to survive under Arctic conditions.

Finally, a comparison of the Harpacticid faunas of the Arctic and Antarctic regions reveals that out of a total of 20 species that occur in both Arctic and Indian waters, only 5, namely—

Ectinosoma melaniceps Boeck,
Microsetella norvegica (Boeck),
Macrosetella gracilis (Dana),
Harpacticus chelifer Müller,
Dactylopusia thisboides (Claus),

are common to both Arctic and Antarctic regions. It thus seems abundantly clear that the barrier to the invasion of the Antarctic by tropical species is not to be found in differences of temperature or salinity in the two regions but, as has already been mentioned, is in all probability due to the existence in the southern region of the various Lines of Convergence, and especially of the Polar or Antarctic Convergence.

Monard (1928*a*, p. 270), when discussing the distribution of these Harpacticid Copepods, remarks: "Enfin un certain nombre d'espèces peuvent être considérées comme cosmopolites; elles ont été trouvées dans des régions extrêmement éloignées, telles que les îles arctiques et les îles antarctiques, avec force stations intermédiaires. Or, il est remarquable de constater que ces espèces sont précisément celles qui sont présentes dans la plupart des habitats de Banyuls, les ubiquistes. Les formes fouisseuses, habitant la vase ou le gravier, ont des domaines plus restreints que celles qui fréquentent les algues. Les cosmopolites sont donc en même temps ubiquistes; nous disons même qu'ils sont cosmopolites parce qu'ils sont ubiquistes."

A study of the preceding lists clearly indicates that certain species of Harpacticids have an almost world-wide distribution, occurring throughout all the great oceans and extending from the southern sub-tropical region to the Arctic ocean; such species are

Longipedia coronata Claus.
L. scotti Sars.
*_L. minor_ T. Scott.
Sunaristes paguri Hesse.
Canuella perplexa T. Scott.
C. furcigera Sars.
*_Ectinosoma melaniceps_ Boeck.
*_E. normani_ T. and A. Scott.
Microsetella norvegica (Boeck).
*_Euterpina acutifrons_ (Dana).
Harpacticus cheliger Müller.
*_H. gracilis_ Claus.
*_H. littoralis_ Sars.
*_Porcellidium fimbriatum_ Claus.
*_Parategastes sphæricus_ (Claus).
*_Tisbe furcata_ (Baird).
T. gracilis T. Scott.
T. ensifera (Fischer).
*_Alteutha interrupta_ (Goodsir).
Scutellidium longicauda (Philippi).
*_Phyllothalestris mysis_ Claus.
Rhynchothalestris rufocincta (Norman).
Parastenhelia littoralis (Claus).
*_Dactylopusia brevicornis_ (Claus).

**D. thisboides* (Claus).
**Parawestwoodia nobilis* (Baird).
**Pseudothalestris minuta* (Claus).
**Diosaccus tenuicornis* (Claus).
**Amphiascus cinctus* (Claus).
A. perplexus (Thompson and A. Scott).
**A. phyllopus* (Sars).
**Stenhelia* (*Delavalia*) *normani* T. Scott.
**Ameira parvula* (Claus).
**A. sibogæ* A. Scott.
Nitocra spinipes Boeck.
**Mesochra pygmæa* (Claus).
**Laophonte cornuta* Philippi.
L. serrata Claus.
L. strömi (Baird).
Laophontodes hamata (Thomson).
Orthopsyllus linearis (Claus).

A comparison of the above list with the lists of species that are known to have their habitat among the littoral algæ at Banyuls or in the neighbourhood of Algiers (*vide* Monard, 1928*a*, p. 267 ; 1937, p. 10) shows that out of a total of 41, no less than 23, or 56 per cent., indicated by an asterisk, are common to both lists.

As Munro Fox (1926, p. 39) has pointed out, " the flora forms an important part of the animal environment and must therefore be a necessary factor in permitting or preventing migrations ", and it seems probable that the dispersal of the algæ and the algal-haunting Harpacticids has proceeded simultaneously and by the same routes.

It is now well known that there is a close similarity between the algal flora of the Indo-Pacific region and the West Indies. To account for this Murray (1893) suggested that they must have been mingled periodically round the Cape of Good Hope during epochs when the climate of the Cape was considerably warmer than it is at the present day. Svedelius (1906), however, suggested that the original connection between these two regions lay to the east instead of the west, and he remarks : " I therefore consider it much more probable that the explanation of the resemblances pointed out by Murray between the Algæ of the West Indies and those of the Indian Pacific Oceans must be looked for rather in the historical development of the connection of land between North and South America, which shows that the whole Caribbean Sea was once a bay of the Pacific, than in the assumption that it depends on a connection *via* the Cape in a time when the external conditions for tropical Algæ were more favourable than to-day."

If this were the true explanation of the similarity between the algal flora of the West Indies and the south-west Pacific region, we should expect to find that the weed-haunting Harpacticids showed an equally close degree of resemblance ; a comparison of the faunal lists of these two regions shows, however, that of the 61 species recorded from Bermuda, and 74 species from the south-west Pacific, only 8 are common to the two regions, namely :

Rhynchothalestris rufocincta (Norman).
Amphiascus cinctus (Claus).
A. hirsutus (Thompson and A. Scott).
Ameira sibogæ A. Scott.
Parastenhelia littoralis (Claus).
Phyllopodopsyllus longicaudatus A. Scott.
Laophonte cornuta Philippi.
Ceyloniella armata (Claus).

Similarly, between the south-west Pacific and the Wood's Hole regions there is but slight agreement, for of the 74 species from the south-west Pacific and 87 species from the Wood's Hole area only 14 are common to both, namely :

Longipedia coronata Claus,
Microsetella norvegica (Boeck),
M. rosea (Dana),
Macrosetella gracilis (Dana),

Clytemnestra rostrata (Brady),
Ægisthus mucronatus Giesbrecht,
Harpacticis chelifer (Müller),
Parategastes sphæricus (Claus),
Tisbe furcata (Baird),
Parastenhelia littoralis (Sars),
Dactylopusia thisboides (Claus),
Amphiascus cinctus (Claus),
Laophonte cornuta Philippi,
Metis jusseaumei (Richard),

and of these, no less than 5 are cosmopolitan pelagic forms, only the remaining 9 being littoral weed-haunting species.

Børgesen (1934, p. 65), from his studies of the Algæ, reached yet another conclusion, for he remarks: "Regarding the remarkable presence of the north-European species in the Arabian Sea they must be supposed, if really present there, to have come there from the north-west when open connections with the Indian Ocean still existed, in quite the same way as Svedelius, as mentioned above, is of opinion that several forms in the Mediterranean have come there from the south-east."

Later authors have agreed with Svedelius in attributing the presence of certain Indo-Pacific species of Algæ in the Mediterranean Sea to a dispersal from the south-east, and this is quite in accordance with my views on the presence in this region of certain Indo-Pacific species of Harpacticids, and with the results obtained by the Cambridge Expedition to the Suez Canal; in his account of this expedition Munro Fox has pointed out that out of 36 species of Algæ taken by the Expedition, "24 of the species collected are either found within the Canal or have passed through it from the Red Sea to Port Said. Only 2 Mediterranean species have penetrated into the Canal, whereas 13 species have wandered in from the Red Sea"; similarly, out of a total of three species of marine Phanerogams found in the Canal, one is cosmopolitan in its distribution and the other two have entered from the Red Sea, while a fourth species has passed through the Canal to the island of Rhodes in the Mediterranean. Børgesen (1935) has shown that the number of species of Algæ common to the west coast of India and the West Indies is 57, or 50 per cent., while the number common to the west coast of India and the Mediterranean Sea is 38, or 33 per cent. One cannot but be struck by the close agreement between these figures and those given above for the percentage of Indian forms of Harpacticids in the same areas, namely, 52 per cent. in Bermuda and 35 per cent. (the mean of 40 per cent. in the eastern part and 30 per cent. in the western) in the Mediterranean Sea.

Finally, Børgesen (*loc. cit.*, p. 61 *et seq.*) calls attention to the fact that a certain number of Indian Algæ are known to occur in the Arctic area, at least five species—

Cystoclonium purpureum (Huds.) Batt.,
Ceramium rubrum (Huds.) Ag., var. *virgata* Ag.,
Polysiphonia elongata (Huds.) Harv.,
Ahnfeltia plicata (Huds.) Fr.,
Corallina officinalis Linn.,
Membranoptera murrayi Boergs (= *M. alata*),

being common to the two areas, and in certain species intermediate areas of distribution, such as the coast of Brazil, the West Indies and the west coast of Europe suggests a connecting link to which these species may have been carried by ocean currents.

We thus have a choice of three possible routes of dispersal. Of these, two routes have been non-existent since the Tertiary Epoch, whereas the third route, *via* the Cape of

Good Hope and along the main surface currents, is in existence to-day. Apart from the great difficulty of supposing that as many as 50 per cent. of the species of littoral algæ or weed-haunting Harpacticids of Bermuda have been isolated since Tertiary times from the Indian region, and yet have retained their characters so completely that at the present day the forms living in these two widely separated areas are morphologically indistinguishable, I cannot but think that one is not justified in relying on geographical features that have ceased to exist since the Tertiary period in order to explain the present distribution, until it has been definitely proved that this distribution is discontinuous, and that there are in existence to-day no factors that will offer an equally possible explanation.

The percentage of Indian Harpacticids that are now known to occur in the littoral fauna of the several regions dealt with in this report may be tabulated as follows :

In the	Gulf of Guinea	the percentage of	Indian	species is	. 70
,,	Malay Archipelago	,,	,,	,,	. 68
,,	Red Sea	,,	,,	,,	. 60
,,	S.W. Pacific area	,,	,,	,,	. 55
,,	Suez Canal	,,	,,	,,	. 55
,,	Bermuda	,,	,,	,,	. 50
,,	E. Mediterranean Sea	,,	,,	,,	. 40
,,	W. coast of Ireland	,,	,,	,,	. 35
,,	S.E. Greenland	,,	,,	,,	. 33
,,	Plymouth	,,	,,	,,	. 31
,,	W. Mediterranean Sea	,,	,,	,,	. 30
,,	Massachusetts coast	,,	,,	,,	. 29
,,	Brittany coast	,,	,,	,,	. 28
,,	Heligoland region	,,	,,	,,	. 28
,,	Devon and Cornwall	,,	,,	,,	. 23
,,	Sub-Antarctic region	,,	,,	,,	. 23
,,	Arctic region	,,	,,	,,	. 19
,,	British Isles (as a whole)	,,	,,	,,	. 19
,,	Firth of Forth	,,	,,	,,	. 18
,,	Norwegian coast	,,	,,	,,	. 15
,,	Antarctic coastal region	,,	,,	,,	. 6

I have already called attention to the fact that the percentage of Indian species in the Norwegian Fauna appears to be less than in the Arctic region ; the same is also true of the percentage of species in the British Fauna as a whole, which is only 19, as compared with the 28 per cent. on the Brittany coast and the Heligoland region, and 33 per cent. on the south-west coast of Greenland. It must, however, be remembered that the Harpacticid fauna of the British Isles and Norway are far better known, and among the species recorded from both these areas are numerous species that are not inhabitants of the Algæ but live in the mud or sand, as for example, species of the genera *Paramesochra* T. Scott, *Leptopsyllus* T. Scott, *Romanea* Klie, *Leptastacus* T. Scott, and others of the Family Canthocamptidæ. The inclusion of these forms in the total number of species in any fauna will markedly lower the percentage of weed-haunting forms.

In the accompanying chart I have given the general trends of the surface currents, and have given the percentage of Indian forms in the Harpacticid fauna of the different regions.

It is very interesting to compare these figures with those given by Cleve (1905) for the Calanoid and Cyclopoid Copepoda of the Agulhas Current; he states that—

In the East Pacific the percentage of Agulhas Current forms is				80
,, Indian Ocean	,,	,,	,,	64
,, Temperate Atlantic	,,	,,	,,	55
,, Mediterranean	,,	,,	,,	50
,, Tropical Atlantic	,,	,,	,,	19
,, Arctic	,,	,,	,,	8

The above figure for the Indian Ocean, namely 64, is, however, much too low, and subsequent researches have shown that 78 per cent. of the forms taken in the Agulhas Current occur in Indian waters. Cleve might also have added that off the west coast of S. Africa the percentage of Agulhas forms is 76. There is thus a considerable degree of similarity between the two series. The dispersal of the Calanoid and Cyclopoid Copepoda is almost certainly caused by the movements of the water-masses in the great ocean currents, and it seems reasonable to conclude that this is the case with the Harpacticids also.

It seems clear that the further away one progresses from the original source of the fauna, the greater is the falling off in the number of species common to both areas. This is particularly well seen as one passes from the Indian Ocean through the Red Sea to the Mediterranean Sea, the numbers falling steadily from 60 to 30; but it is also clear that a similar reduction is going on in the various regions of the North Atlantic. As one passes from the Gulf of Guinea to Bermuda there is a marked fall from 70 per cent. to 50 per cent.; then as we again cross the Atlantic Ocean the percentage drops to 35 on the west coast of Ireland, and as we trace the westwardly-directed branch of the North Atlantic Drift past Iceland to Greenland the number still further falls to 33, and as a result of the meeting of this branch with the Labrador current the figure falls to 29 on the Massachusetts coast. Tracing the branch that passes to the north-east round the coast of Scotland, we see that the figure drops to 18 in the Firth of Forth and then to 15 on the Norwegian coast. It is well known that only a small offshoot of the North Atlantic Drift enters the English Channel, and hence the number is less in this area than on the west coast of Ireland, namely, 28 on the Brittany coast and in the region of Heligoland and the north German coast and 23 on the coast of Devon and Cornwall, this difference between the north and south sides of the English Channel being perhaps due to the active migration of a few species from the Mediterranean region round the European coast-line.

REFERENCES.

Børgesen, F. 1934. Some Marine Algæ from the Northern Part of the Arabian Sea, with Remarks on their Geographical Distribution. K. Danske vidensk. Selsk. Biol. Meddelelser, XI, No. 6.

Brady, G. S. 1880. A Monograph of the Free and Semi-parasitic Copepoda of the British Isles, III. Ray Society, London.

—— 1883. Report on the Copepoda obtained by H.M.S. "Challenger" during the years 1873–1876. Rep. Sci. Results of the Voyage of H.M.S. "Challenger", Zool. VIII, Pt. 1.

—— 1899. On the Marine Copepoda of New Zealand. Trans. Zool. Soc. London, XV, Pt. 2.

—— 1905. On Copepoda and Other Crustacea taken off Northumberland and Durham in July, 1904. Trans. Nat. Hist. Soc. Northumb. (n.s.), I.

BRADY, G. S. 1910. Die marinen Copepoden der deutschen Südpolar-Expedition, 1901–03 : I, Über die Copepoden der Stamme Harpacticoida, Cyclopoida, Notodelphyoida und Caligoida. Deutsch. Südpolar Expedition, 1901–03, XI (Zool. III), Heft V.

—— 1914. On some Pelagic Entomostraca Collected by Mr. J. Y. Gibson in Durban Bay. Ann. Durban Mus. I, Pt. 1.

BRIAN, A. 1926. Synonymie zwischen der *Nitocra tau* Giesbrecht und *Canthocamptus parvulus* Claus (Copepoda Harpacticoida). Zool. Anz. LXVIII, p. 248.

—— 1927. Descrizione di un nuovo gener di Harpacticoide del Mare Egeo. Boll. Mus. di Zool. Anat. comp. Genova (2), VII, No. 9.

—— 1928*a*. Descrizione di specie nuove o poco conosciute di Copepodi bentonici del Mare Egeo. Boll. Mus. di Zool. Anat. comp. Genova (2), VIII, No. 18 (1927).

—— 1928*b*. I Copepodi bentonici marini. Arch. Zool. (Ital.) Napoli, XII, Fasc. 3–4.

CANU, E. 1892. Les Copepodes du Boulonnais.

CAR, L. 1884. Ein Beitrag zur Copepoden-fauna des Adriatisches Meeres. Arch. Naturgesch., Jahrgang 50, Bd. I.

CHILTON, C. 1910. Note on the Dispersal of Marine Crustacea by Means of Ships. Trans. N.Z. Inst. XLIII, p. 131.

CLAUS, C. 1863. Die freilebenden Copepoden. Leipzig.

—— 1866. Die Copepoden-fauna von Nizza. Marburg und Leipzig.

CLEVE, P. T. 1901. Plankton from the Indian Ocean and the Malay Archipelago. K. Svenska Vetensk-Akad. Handl. XXXV, No. 5.

—— 1904*a*. Report on Plankton collected by Mr. Thorild Wulff during a voyage to and from Bombay. Ark. Zool. I.

—— 1904*b*. Plankton of the S. African Seas : Copepoda. Mar. Invest. S. Africa, III.

FARRAN, G. P. 1913*a*. Clare Island Survey, Pt. 45 : Marine Entomostraca. Proc. R. Irish. Acad. XXXI.

—— 1913*b*. Plankton from Christmas Island, Indian Ocean, II : On Copepoda of the Genera *Oithona* and *Paroithona*. Proc. Zool. Soc. London, p. 181.

—— 1926. Biscayan Plankton Collected during a Cruise of H.M.S. " Research ", 1900 : The Copepoda. J. Linn. Soc. London, Zool. XXXVI.

—— 1929. Crustacea. Pt. X : Copepoda. British Antarctic (" Terra Nova ") Expedition, 1910, Zoology, VIII, No. 3.

—— 1936. Copepoda. Sci. Reports, Great Barrier Reef Expedition, 1928–29, V, No. 3.

FISCHER, S. 1860. Beitrage zur Kenntnis der Entomostraceen. Abh. Math.-Physikalischen Classe der K. Bayer. Akad. Wiss. VIII, p. 645.

FOX, H. MUNRO. 1929. The Cambridge Expedition to the Suez Canal, 1924 : Summary of Results. Trans. Zool. Soc. London, Pt. 6.

FRÜCHTL, F. 1920. Planktoncopepoden aus der nordlichen Adria. S.B. Akad. der Wiss. Wien, CXXIX, Abt. 1, Heft 9.

—— 1924. Die Cladoceren und Copepoden Fauna der Aru-Archipels. Arb. d. Zool. Institut d. Univ. Innsbruck, Bd. II, Heft 2.

GIESBRECHT, W. 1892. Pelagischen Copepoden (Systematik und Faunistik). Fauna u. Flora, Neapel, XIX. Berlin.

—— 1896. Ueber pelagischen Copepoden des Rothen Meeres, gesammelt vom Marinestabsartz Dr. Augustin Kramer. Zool. Jb., Syst. Abt. IX.

—— 1902. Copepoden. Resultats du Voyage du S.Y. "Belgica" en 1897–1899. Rapp. Sci. Zool. Anvers.

GURNEY, R. 1927*a*. Report on the Crustacea : Copepoda and Cladocera of the Plankton. Cambridge Expedition to the Suez Canal, 1924. Trans. Zool. Soc. London, XXII, Pt. 2.

—— 1927*b*. Report on the Crustacea : Copepoda of Brine Pools at Kabret. Trans. Zool. Soc. London, XXII, Pt. 2.

—— 1927*c*. Report on the Crustacea : Copepoda (Littoral and Semi-parasitic). Trans. Zool. Soc. London, XXII, Pt. 4.

—— 1931. British Fresh-water Copepoda, I. The Ray Society, London.

—— 1932. British Fresh-water Copepoda, II. The Ray Society, London.

JAKUBISIAK, ST. 1932. Sur les Harpacticoides herberges par Maia squinado. Bull. Soc. Zool. Fr. LVII, No. 6.

—— 1933. Notes sur les Harpacticoides de l'Adriatique (Ile de Solta, Dalmatia). Fragm. faun. Mus. Zool. Poloni, II, No. 11.

Jespersen, P. 1939. The Zoology of East Greenland : Copepods. Medd. Grønland Komm. f. Videnskab. Unders. f. Grønland, CXXI, No. 3.

Klie, W. 1913. Die Copepoda Harpacticoida des Gebietes der Unter- und Aussenweser und der Jade. Selbstverlag des Vereins für Naturkunde an der Unterwesser, III.

Kunz, von H. 1935. Zur Œkologie der Copepoden Schleswig-Holsteins und der Kieler Bucht. Schr. Naturw. Ver. Schl.-Holst. XXI, Heft 1.

Lang, K. 1933. Zwei neue Brackwasserharpacticiden von den Macquarie-Inseln. K. Fysiogr. Sällsk. Lund Förh. III, No. 1.

—— 1934. Marine Harpacticiden von der Campbell-Insel und einigen anderen sudlichen Inseln. Lunds Universitets Arsskrift, n.f., Avd. 2, Bd. XXX, No. 14. K. Fysiogr. Sällsk. Handlingar, n.f., Bd. XLV, No. 14.

—— 1935*a*. Harpacticiden aus dem Mittelmeer. K. Fysiogr. Sällsk. Lund. Förh. V, No. 9.

—— 1935*b*. Über Umfang und systematische Stellung einiger Harpacticidengenera. K. Fysiogr. Sällsk. Lund Förh. III, No. 1.

—— 1936. Die während der schwedischen Expedition nach Spitzbergen 1898 und nach Grönland 1899 eingesammelten Harpacticiden. Kgl. Svenska Vet.-Akad. Handl. (Series 3), Bd. XV, No. 4.

Marine Biological Association. 1931. Plymouth Marine Fauna (2nd edition).

Monard, A. 1926. Note sur la Faune des Harpacticoides marins de Cette. Arch. Zool. exp. gén. LXV, Notes et Revue, No. 2, p. 39.

—— 1927. Synopsis universalis generum Harpacticoidarum. Zool. Jb. Abt. Syst. LIV (1928), p. 139.

—— 1928*a*. Les Harpacticoides marins de Banyuls. Arch. Zool. exp. gén. LXVII, p. 259.

—— 1928*b*. Le genre Amphiascus (Copépodes Harpacticoides). Rev. Suisse Zool. XXXV, No. 19.

—— 1934. Description de trois Harpacticides marins d'Angola. Rev. d. Zool. Bot. Afr. XXVI, Fasc. 1.

—— 1935. Étude sur la Faune Harpacticoides marins de Roscoff. Trav. Sta. Biol. Roscoff, fasc. 13.

—— 1937. Les Harpacticoides marins de la Region d'Alger et de Castiglione. Bull. Sta. Aquic. Pêches Castiglione.

Murray, G. 1893. Phycological Memoirs, Pt. II.

Nicholls, A. G. 1935. Copepods from the Interstitial Fauna of a Sandy Beach. J. Mar. Biol. Ass. U.K., n.s., XX, No. 2, p. 379.

—— 1939. Some New Sand-dwelling Copepods. J. Mar. Biol. Ass. U.K. XXIII, No. 2, p. 327.

Norman, A. M. 1911. Three Species of Harpacticid Copepoda. Trans. Linn. Soc. London, XI.

—— and Scott, T. 1906. The Crustacea of Devon and Cornwall. William Wesley & Son, London.

Pearson, J. 1905. A List of the Marine Copepoda of Ireland and Fish Parasites. Fisheries Ireland Sci. Invest. 1904, III ; Pt. 1 : Littoral Forms.

Pesta, O. 1909. Zoologische Ergebnisse XV. Copepoden (I Artenliste 1890) Bericht der Komm. f. Erforsch. des Östlicher Mittelmeeres.

—— 1911. Zoologische Ergebnisse XVIII, Copepoden des Östlichen Mittelmeeres (II und III Artenliste, 1891 and 1892). Bericht des Komm. f. Oceanograph. Forschung. des Östlichen Mittelmeeres.

—— 1920. Die Planctoncopepoden der Adria. Zool. Jb., Abt. Syst. XLIII.

—— 1926. Sur une collection de Copépodes pelagiques provenant des croissieres des yachts du Prince Albert 1er de Monaco. Bull. Inst. Oceanogr. Monaco, No. 477.

Quidor, M. A. 1920. Copépodes. Expedition Antarctique Française (1903–1905). Paris.

Richard, J. 1893. Copépodes recueillis par M. le Dr. Th. Barrois en Egypte, en Syrie et en Palestine. Rev. Biol. Nord. France, V.

Sars, G. O. 1903–11. An Account of the Crustacea of Norway. Vol. V : Copepoda, Harpacticoida. Bergen.

—— 1905. Pacifische Plankton-Crustaceen : II, Brack-wasser Crustaceen von dem Chatham-Inseln. Zool. Jb., Abt. Syst. XXI.

—— 1909. Report of the Second Norwegian Arctic Expedition in the Fram, 1898–1902. No. 18, Crustacea. Videnskabs. Selskabet. I. Kristiania.

—— 1916. Liste systématique des Cyclopoidés, Harpacticoidés et Monstrilloidés recueillis pendant les campagnes de S.A.S. le Prince Albert de Monaco, avec descriptions et figures des espèces nouvelles. Bull. Inst. Oceanogr. Monaco, No. 323.

—— 1921. An Account of the Crustacea of Norway. VII, Copepoda, Supplement. Bergen.

Schott, G. 1926. Geographie des Atlantischen Ozeans. Hamburg.

—— 1935. Geographie des Indischen und Stillen Ozeans. Hamburg.

Scott, A. 1902. On some Red Sea and Indian Ocean Copepoda. Proc. Liverpool Biol. Soc. XVI.

—— 1909. The Copepoda of the " Siboga " Expedition. " Siboga " Expeditie, Fasc. 39.

SCOTT, T. 1893. Additions to the Fauna of the Firth of Forth. Ann. Rep. Fishery Board, Scotland, Pt. III, Sci. Invest., p. 200.

—— 1894. Additions to the Fauna of the Firth of Forth, Pt. VI. Ann. Rep. Fishery Board, Scotland, Pt. III, Sci. Invest., p. 231.

—— 1899. Report on the Marine and Fresh-water Crustacea from Franz-Josef Land, collected by Mr. William S. Bruce of the Jackson-Harmsworth Expedition. J. Linn. Soc. London, Zool. XXVII, p. 60.

—— 1905*a*. On some Entomostraca from the Gulf of St. Lawrence. Trans. Nat. Hist. Soc. Glasgow (N.S.), VII (1902–03), Pt. 2, p. 46.

—— 1905*b*. On some New and Rare Crustacea from the Scottish Seas. Ann. Rep. Fishery Board, Scotland, Pt. III, Sci. Invest., p. 142 (1904).

—— 1914. Remarks on some Copepoda from the Falkland Islands collected by Mr. Rupert Vallentin, F.L.S. Ann. Mag. Nat. Hist. (Ser. 8), XIII, p. 369.

SCOTT, T. and A. 1893. Notes on Copepoda from the Firth of Forth. Ann. Scot. Nat. Hist. II.

—— 1894. On some New and Rare Crustacea from Scotland. Ann. Mag. Nat. Hist. (Ser. 6), XIII, p. 137.

—— 1895*a*. On some New and Rare Crustacea from Scotland. Ann. Mag. Nat. Hist. (Ser. 6), XV, p. 50.

—— 1895*b*. On New and Rare Species of Copepoda from Scotland. Ann. Scot. Nat. Hist., p. 28.

—— 1896. A Revision of the British Copepoda belonging to the Genera *Bradya* Boeck and *Ectinosoma* Boeck. Trans. Linn. Soc. London (Ser. 5), VI, p. 419.

—— 1901. On some Entomostraca Collected in the Arctic Seas in 1898 by William S. Bruce, F.R.S.G.S. Ann. Mag. Nat. Hist. (Ser. 7), VIII, p. 337.

SCOURFIELD, D. J. 1912. Clare Island Survey, Pt. 46: Fresh-water Entomostraca. Proc. R. Irish Academy, XXXI.

SEWELL, R. B. S. 1914. Notes on the Surface Copepoda of the Gulf of Mannar. Spolia Zeylanica, IX, Pt. 35, p. 191.

—— 1924. Fauna of the Chilka Lake: Crustacea, Copepoda. Mem. Ind. Mus. V.

—— 1929. The Copepoda of Indian Seas: Calanoida (Pt. I). Mem. Ind. Mus. X.

—— 1932. The Copepoda of Indian Seas: Calanoida (Pt. 2). Mem. Ind. Mus. X.

—— 1934. A Study of the Fauna of the Salt Lakes, Calcutta. Rec. Ind. Mus. XXXVI.

SHARPE, R. W. 1910. Notes on the Marine Copepoda and Cladocera of Wood's Hole and Adjacent Regions, Including a Synopsis of the Genera of the Harpacticoida. Proc. U.S. Nat. Mus. XXXVIII.

SMIRNOW, S. S. 1932. Zur Fauna der marinen Copepodea-Harpacticoida von Franz-Joseph Land. Trans. Arctic Inst. U.S.S.R. II.

STEUER, A. 1910. Adriatische Planktoncopepoden. S.B. Akad. Wiss. Wien, CXIX, Abt. 1.

—— 1931. Grössen- und Formvariation der Planktoncopepoden. S.B. Akad. Wiss. Wien, Abt. 1, CXL.

STUBBINGS, H. G. 1936. Cirripedia. The John Murray Expedition, Sci. Reports IV.

SVEDELIUS, N. 1906. Ecological and Systematic Studies of the Ceylon Species of *Caulerpa*. Ceylon Mar. Biol. Reports, No. 4.

THALLWITZ, J. 1914. Zur Kenntnis von *Canthocamptus typhlops* Mrazek und *C. wierzeiskii* Mrazek. Zool. Anz. XLIV, p. 492.

THOMPSON, I. C. 1893. Revised Report on the Copepoda of Liverpool Bay. Trans. Liverpool Biol. Soc. VII, p. 175.

—— and SCOTT, A. 1900. Some Recent Additions to the Copepoda of Liverpool Bay. Trans. Liverpool Biol. Soc. XIV, p. 139.

—— —— 1903. Report on the Copepoda. Ceylon Pearl Oyster Fisheries, Suppl. Rep. No. VII. The Royal Society, London.

THOMSON, G. M. 1883. On the New Zealand Copepoda. Trans. and Proc. New Zealand Inst. XV (1882).

TIMM, R. 1894. Beiträge zur Fauna der Südöstlichen und östlichen Nordsee: IV, Copepoden und Cladoceren. Wiss. Meeresuntersuch. N.F., Bd. I, Heft 1.

WILLEY, A. 1929. Notes on the Distribution of Free-living Copepoda in Canadian Waters: Pt. II, Some Intertidal Harpacticids from St. Andrews, New Brunswick. Contr. Canad. Biol. and Fisheries, being Studies from the Biological Stations of Canada, N.S. IV, No. 33.

—— 1930. Harpacticoid Copepoda from Bermuda: Pt. I. Ann. Mag. Nat. Hist. (Ser. 10), VI, p. 81.

—— 1931. Copepod Phrenology: Observations Based on New Material from Canada and Bermuda. Arch. Zool. (Ital.) Napoli, XVI.

—— 1935. Harpacticoid Copepoda from Bermuda, Pt. 2. Ann. Mag. Nat. Hist. (Ser. 10), XV, p. 50.

Wilson, C. B. 1924. New North American Parasitic Copepods, new Hosts and Notes on Copepod Nomenclature. Proc. U.S. Nat. Mus. LXIV, Art. 17.

—— 1932*a*. Copepods of the Wood's Hole Region. U.S. Nat. Mus. Bull. 158.

—— 1932*b*. Copepoda of Chesapeake Bay. Proc. U.S. Nat. Mus. No. 80.

Wolfenden, R. N. 1906. Notes on the Collection of Copepoda. Fauna and Geography of the Maldive and Laccadive Archipelagos, II. Cambridge.

—— 1908. Copepoda. National Antarctic Expedition, Natural History, IV, Zoology, No. 8. British Museum, London.

—— 1911. Die marinen Copepoden der Deutschen Südpolar Expedition. Deutschen Südpolar Expedition, XII, Zool. IV.

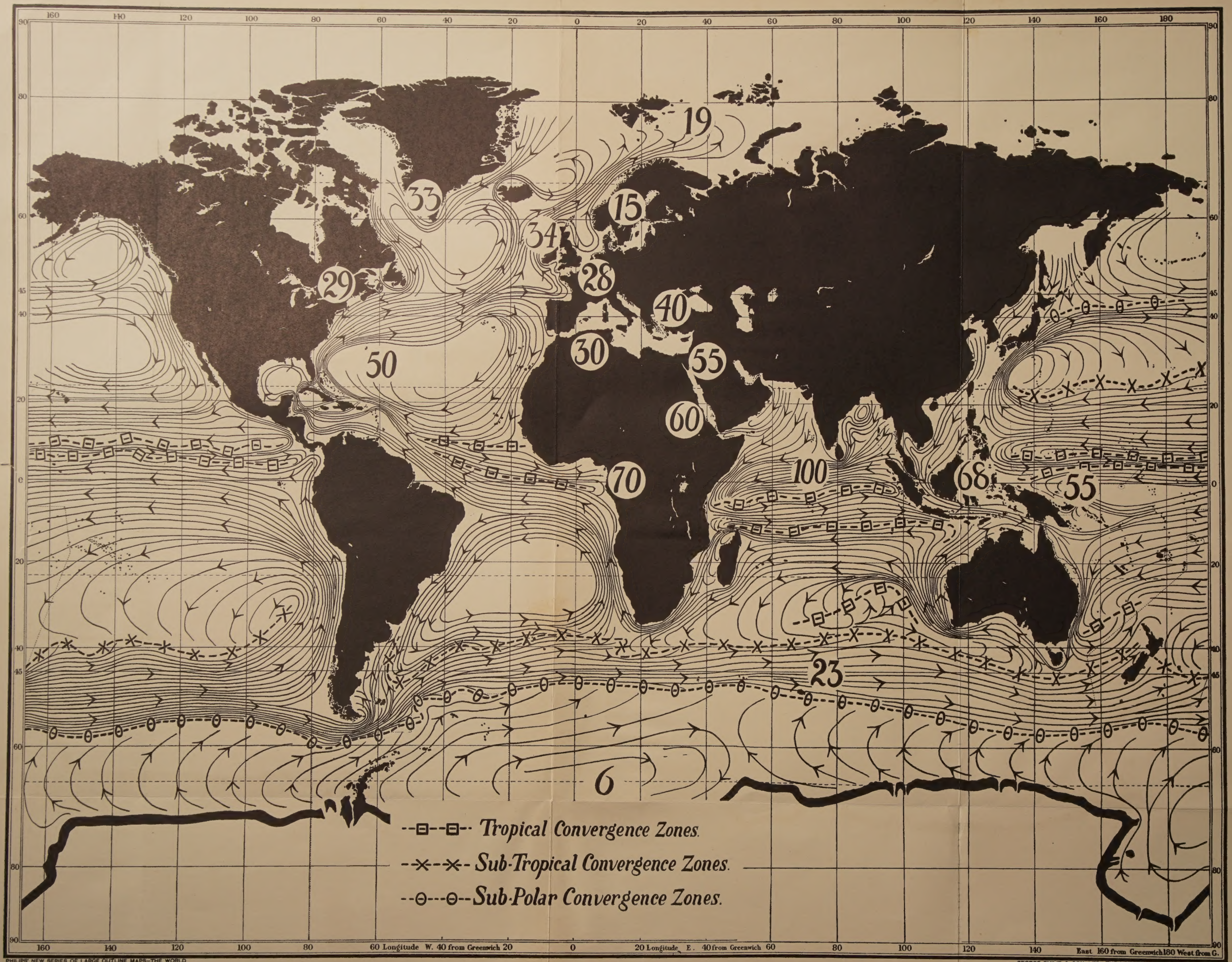
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Chart showing the percentage of Indian species in the Harpacticid fauna of different regions and the general trend of surface currents.